

# **Opening Session**

## **(9:30-10:00)**

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### **OPENING REMARKS**

**Oh Seok Hyun** President of Korea Development Institute, Korea

### **WELCOMING REMARKS**

**Je Yoon Shin** First Vice Minister of Ministry of Strategy and Finance, Korea

### **CONGRATULATORY REMARKS**

**Andrey Kortunov** Director General of Russian International Affairs Council, Russia

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# Opening Session



## Opening Remarks

### **Oh-Seok Hyun**

President of Korea Development Institute

Oh-Seok HYUN currently is the President of the Korea Development Institute (KDI), Korea's leading think tank. He is a member of the Presidential Council on National Competitiveness, Presidential Committee on Green Growth, Advisory Council on Presidential Committee for G-20 Summit and Prime Minister's International Development Cooperation Committee. He is also a member of National Advisory Council on the Social Security System, Fiscal Management Committee, and National Pension Fund Operation. He is further partaking in the international development and cooperation as a member of Knowledge Advisory Commission of the World Bank.

Dr. Hyun was the Chairman of the Non-governmental Public Serving Organization (NPSO) Evaluation Board for the Ministry of Strategy and Finance in 2008. While he was serving as the President of the Institute for International Trade of the Korea International Trade Association, Dr. Hyun contributed in the formulation of international economic policy for financial stability and trade agreements including the KOR-US FTA, KOR-EU FTA and the DDA. Dr. Hyun's extensive experience in policy making and research in the public sector is a unique career path for a government official in Korea. Dr. Hyun served as Deputy Minister of Finance and Economy (2000~2001), and Special Advisor to Deputy Prime Minister and Minister of Finance and Economy (2001~2002). He was a Director-General of Budget Office and Bureau of Treasury of the Ministry of Finance and Economy. He worked as Secretary for Economic Affairs at the Office of the President, Director-General of the National Economic Advisory Council, and an Economist at the World Bank. He led the structural reform during the Asian Financial Crisis as

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Director-General at the Bureau of Economic Policy of the Ministry of Finance and Economy.

Dr. Hyun received his Ph.D. in Economics from the University of Pennsylvania (1984). His pursuit in teaching and research rewarded him a professorship at the Korea Advanced Institute of Science and Technology (KAIST) and an experience as the Dean of the National Tax College. Dr. Hyun regularly provides insightful knowledge on open-economy macroeconomics, industrial policies and social development through publication and media interviews to further contribute towards designing of economic policies suitable for this truly global era.

# Opening Session



## Welcoming Remarks

### Je-Yoon Shin

First Vice Minister of Ministry of Strategy and Finance

Mr. Shin has been with the Ministry of Strategy and Finance since 1982, and held various positions, especially in the fields of domestic and international finance. Between March and September 2011, he served as the vice chairman of Financial Services Commission, a consolidated policy-making government body that formulates financial policies and supervises financial systems. Prior to this, he was Deputy Minister of the MOSF between 2008 and 2011, and during the year of 2010, he served as the chair for G20 Deputies Meeting, playing role in addressing global issues including financial safety nets, IMF reforms and global imbalances. In 2008, he made great contributions to shielding Korea from the global financial crisis through Korea's currency swap arrangements with the U.S, Japan and China. Mr. Shin has been dedicated to regional financial cooperation, and his efforts culminated in the establishment of the CMIM (Chiang Mai Initiative Multilateralization) in 2008 among ASEAN+3 countries.

Previously as Director General for the International Finance Bureau from 2007 to 2008, Mr. Shin was in charge of monitoring foreign exchange market in Korea, and ensuring stability in financial markets. His efforts led to sovereign credit rating upgrades by international credit rating agencies. Between 2005 and 2007, he was the chief financial sector delegate for the Korea-US FTA negotiations, and he also served as Secretary to the President for National Economic Affairs in the Office of President

# Opening Session



## Congratulatory Remarks

### **Andrey Kortunov**

Director General of Russian International Affairs Council, Russia

Andrei Kortunov is the Director General of the Russian International Affairs Council, the President of the New Eurasia Foundation and Information Scholarship Education Center (ISE).

Mr. Kortunov graduated from the Moscow State University of International Relations and pursued postgraduate studies at the Institute for the U.S. and Canadian Studies (PhD in history) where he served as deputy director and head of the Foreign Policy Department.

Key academic interests: international affairs, foreign and domestic policy of Russia, Russian-American relations

He was a visiting professor at American universities including the University of California (Berkeley) and the University of Miami.

Andrei Kortunov is an author of more than 120 publications, focused on US-Soviet/Russian relations, international security issues, and Soviet/Russian domestic and foreign policy.

# **Session 1.**

## **International Monetary System Reform**

### **(10:30-12:30)**

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#### **Chair**

**Jong Wha Lee** Senior Advisor to the President for International Economy, Korea

#### **PRESENTATIONS**

1. **Yung Chul Park** Professor at Korea University, Korea  
    **Charles Wyplosz** Professor at Graduate Institute in Geneva, Switzerland
2. **Yoon Je Cho** Professor at Sogang University, Korea
3. **Charles Wyplosz** Professor at Graduate Institute in Geneva, Switzerland  
    (to be presented by Yung Chul Park)
4. **Liqing Zhang** Professor at Central University of Finance and Economics in Beijing, China
5. **Sungmin Kim** Professor at KAIST, Korea

#### **PANEL DISCUSSION**

1. **Marc Uzan** Executive Director of Reinventing Bretton Woods Committee, France
  2. **Lee Il Hong** Chief Resident Representative Beijing, China International Monetary Fund, China
  3. **Maria Bautista** Senior Economic Advisor in the Economics and Research Department of Asian Development Bank, Philippines
  4. **So Young Kim** Professor at Seoul National University, Korea
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## Session 1

# International Monetary System Reform



Chair

## Jong Wha Lee

Senior Advisor to the President for International Economy, Korea

Dr. Jong-Wha Lee is Senior Advisor to the President for International Economy and G-20 Sherpa in the Republic of Korea. He is also professor in the economics department of Korea University and currently on leave. He was the Chief Economist of the Asian Development Bank (ADB) and Head of ADB's Office of Regional Economic Integration from March 2007 to September 2010.

Dr. Lee has over 20 years of professional experience as an economist and an academic. He worked as Economist at the International Monetary Fund and taught at Harvard University and Australian National University. He had served as a consultant to the Harvard Institute for International Development, the Inter-American Development Bank, the International Monetary Fund, the United Nations Development Programme, and the World Bank.

Dr. Lee was the Director of the International Center for Korean Studies at Korea University. He has published numerous books and reviewed journal articles in English and Korean, especially on topics relating to human capital, growth, financial crisis, and economic integration.

Dr. Lee, a national of the Republic of Korea, obtained his Ph.D. and Master's degree in Economics from Harvard University, and his Master's and Bachelor degrees in Economics from Korea University in Seoul.

## Session 1

# International Monetary System Reform



### Presentation 1

## Yung Chul Park

Professor at Korea University, Korea

Yung Chul Park is distinguished professor in the division of international studies, Korea University. He previously served as the chief economic adviser to the President of Korea (1987-1988), as president of the Korea Development Institute (1986-1987), and as president of the Korea Institute of Finance (1992-1998). He also worked for the International Monetary Fund (1968-1974), where he is currently serving as an adviser for the Asia-Pacific department. He has written and edited several books including *Economic Liberalization and Integration in East Asia* (Oxford university press 2006).



## Session 1

# International Monetary System Reform



### Presentation 1

## Charles Wyplosz

Professor at Graduate Institute in Geneva, Switzerland

Charles Wyplosz is Professor of International Economics at the Graduate Institute in Geneva where he is Director of the International Centre for Money and Banking Studies.

Previously, he has served as Associate Dean for Research and Development at INSEAD and Director of the PhD program in Economics at the Ecole des Hautes Etudes en Science Sociales in Paris. He also has been Director of the International Macroeconomics Program of CEPR, the leading European network of economists.

His main research areas include financial crises, European monetary integration, fiscal policy and regional monetary integration. He is the co-author of two leading textbooks (*Macroeconomics* and *European Economic Integration*) and has published several books. Previously a founding Managing Editor of the review *Economic Policy*, he serves on several boards of professional reviews and European research centers. He is a regular columnist in newspapers (*Financial Time*, *Le Monde*, *Libération*, *Le Temps*, *Finanz und Wirtschaft*, and *Handelsblatt*), he had a weekly spot on *Radio Suisse Romande* and is frequently interviewed by major media. He is a founding contributor of websites VoxEU and Telos.

Currently a member of the Advisory Scientific Committee of the European Systemic Risk Board, of the Panel of Experts of the European Parliament's Economic and Monetary Affairs Committee, and of the "Bellagio Group",

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Charles Wyplosz is an occasional consultant to the European Commission, the IMF, the World Bank, the United Nations, the Asian Development Bank, and the Inter-American Development Bank. He has been a member of the “Conseil d’Analyse Economique” which reports to the Prime Minister of France, of the French Finance Minister’s “Commission des Comptes de la Nation” and has advised the President of France and the governments of the Russian Federation and of Cyprus.

Recent speaking engagements include interventions at the European Central Bank, the German Bank Association, the Asian Development Bank, and numerous banks around the world.

A French national, Charles Wyplosz holds degrees in Engineering and Statistics from Paris and a PhD in Economics from Harvard University.

## International Monetary Reforms: A Critical Appraisal of Some Proposals

### 1. Introduction

The international monetary system is changing. Globalization and the ascent of the emerging markets are bringing to the fore a number of issues that are not new but that had been little attended to. They are also changing the balance of power in a system that retains the imprint of the Bretton Conference of 1944. A new impetus comes from the amazing sight of acute crises in the US and Europe. In a way, the issues that surface now are not new. The shortcomings of the international monetary system have been studied ad nauseam and the list of reform proposals is virtually endless. At the same time, economic and political developments, both on-going and predictable, inevitably change the agenda and the reshape the realm of what is possible to achieve.

The present paper selectively reviews some of the current debates. Section 2 looks at the future role of the US dollar and concludes that despite all its deficiencies it will remain the dominant reserve currency. This is followed in section 3 by an examination of the role of the SDR whether it could serve as a reserve currency and asset, and the answer is no. Section 4 reviews the background and merits of capital controls in a new global financial environment. Talks about an impending currency war have attracted attention once more to potentially disrupting capital flows. Exchange rate overvaluation is often followed by sudden stops and destructive reversals (Calvo and Reinhart, 2000). A long tradition has called for the use of capital controls, preferably market-friendly, to discourage capital movements that are driven by herd behavior as opposed to economic fundamentals (see e.g. Eichengreen et al., 1995). The IMF position has long oscillated between firm hostility and reluctant acceptance. The position has changed somewhat, as was visible at the Seoul G20 Summit in November 2010. Refining the instruments, and making them better attuned to present-day markets, may bring further changes to the conventional wisdom.

Section 5 discusses the future prospects of regional monetary arrangements. The 2008 crisis has dimmed much of the earlier hope that the East Asian Chiang Mai Initiative Multilateralized (CMIM) arrangement would become operational. The European debt crisis is still under way may lead to a breakup of the Eurozone. It already has made it clear that deep regional monetary integration is more difficult than had been officially recognized so far. What is left, then, of the idea that such arrangements are the way of the future? We take a critical look at this debate, pointing out that details crucially matter and that nuances are called for in coming up with conclusions.

Section 6 examines the prospect of the spread of swap agreements among central banks. Of course, swaps have existed before but they have been activated on a wider scale than before in the

aftermath of the collapse of Lehman Brothers. Does it portend a new form of international monetary cooperation? Section 4 explores this issue.

Section 7 deals with the creation G20 has been widely seen as a historical step. Three years down the road, section 5 focuses on the crises in some of the largest economies. It argues that some countries are systemically large. The US subprime crisis brought a worldwide recession. The European debt crisis could trigger an even worse global crisis. For the G20 to matter, it should be able to ensure that the systemically important countries adopt correct strategies if and when their economic and financial situations become a threat to global prosperity. Section 8 concludes the paper.

## **2. The future Role of the Dollar<sup>1</sup>**

To many economists and policy makers throughout both advanced and emerging economies, the international currency is under the control of a single country-the US. Even worse, this country has been running huge external deficits for more than a decade and is now the worldthat ngle largest debtor. Even more vexing, the global economy already crashed into this problem in the late 1960s, the inaction to which resulted in the collapse of the Bretton Woods system. The 2008 global financial crisis and the on-going euro-zone sovereign debt crisis have renewed the effort to rebuild the international monetary system. The replacement of the G7 with the G20 is the unmistakable signal that the US and the other developed countries have come to grip with the new realities. It is not surprising that one of China's first moves was to call for a new arrangement that will bring the dollar's supremacy to its long-anticipated end.

But everything written on the dollar is at best inaccurate, mostly plain wrong. The first aspect of the debate on the dollar that should be emphasized is that the dollar is nowhere near to lose its international status for a simple reason that there is no replacement. Gold has been a good investment. But as a currency, gold has long ceased to exist for a good reason: it is utterly inconvenient. In a world where money is increasingly becoming electronic, going back to gold coins and bullion is perfectly anachronistic. The euro was often seen as the challenger, but now its survival is at stake.

A second aspect is that the dollar is the dominant currency for international trade invoicing and payments. The dominance matters little for anything but book-keeping, though it is practical and less risky to deal in your currency.

The third aspect is what is attracting most attention, and matters most: the foreign exchange reserves of central banks around the world. These reserves are not held in cash but mostly in US Treasury bills. The total amount, \$4,400 billion, is about ten times the value of dollars held outside the US. The dollar's share of foreign exchange reserves is currently about 60% and slowly declining. The trend, if continued, would indeed imply that the dollar would be a minor reserve currency by 2025.

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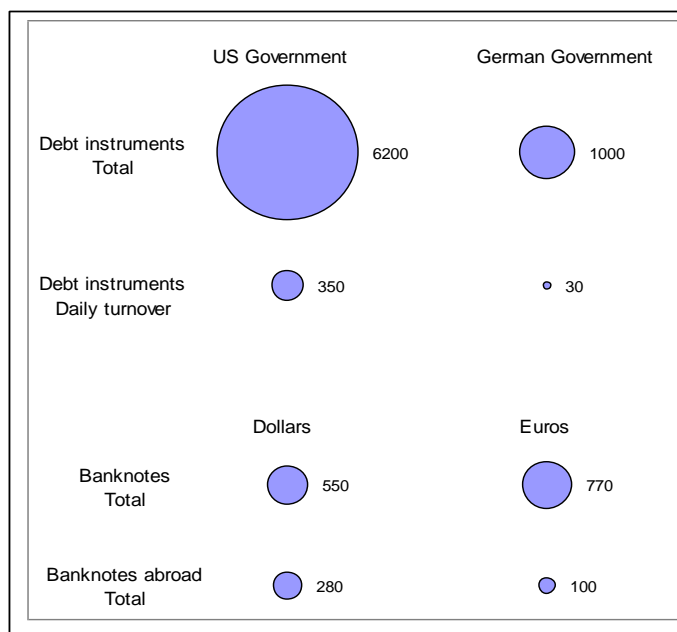
<sup>1</sup> Sections 2 and 3 draw on Wyplosz (2011)

The process might be sped up by the People’s Bank of China, which holds about half of the world reserves and has made it known that it wants to reduce the share of dollars in its stockpile.

These trends, however, should not be assumed to continue forever. It is perfectly possible for the Chinese authorities and others to now acquire new reserves in other currencies than the dollar but that does not mean that they can go on forever – assuming that they will accumulate reserves forever – nor that they can turn around their current stock. The key reason is that there is simply no alternative, at least for the foreseeable future.

Once again, it is essential to remember that reserves are held in interest-yielding public debt instruments, not cash. Obviously, these must be safe instruments, which would presumably exclude a large number of euro area governments. The safest euro-denominated instruments are issued by the German government, with very few other candidates. Central banks want these instruments to be not just safe, but quickly sellable in case of emergency. Unless the market is deep enough, emergency sales may resemble fire sales that entail capital losses. The market for US Treasuries is the world’s deepest. The total value of existing US public debt instruments is nearing \$9,000 billion, of which \$500 billion is traded on an average day (Figure1). German debt instruments amount to about €1,000 billion, with an average daily turnover of less than €30 billion. The situation is similar for French debt instruments. The US simply plays in a different league. Of course, things can change over time. Turnover can increase but German government debt will remain small, unless it is multiplied several times over, in which case it would achieve junk status!

**Figure 1 Debt Instruments of the US and Germany**



All values in billions of euros.

Sources: US Treasury, Deutsche Finanzagentur, Federal Reserve Board, ECB.

### 3. The SDR

There has been much interest in the International Monetary Fund's Special Drawing Rights (SDRs). This is not money, it is a right for central banks to obtain dollars, euros or other currencies of wide international use. As such it can serve as foreign exchange reserves but the total stock is currently worth \$320 billion, a trivial amount. Its value is more stable than that of its composite currencies, and this may be why some developing countries and development advocates have been calling for a massive increase in SDRs to offer an alternative to the dollar. Politically it makes little sense for the US to support such a move, but there is a deeper economic reason why SDR will never fulfill the ambitions of its supporters. As a composite of other currencies, the SDR must be underwritten by the central banks that issue these currencies. New SDRs are effectively new dollars, euros, yens, etc. But no one knows which currencies will be “drawn” – i.e. effectively used – and when. No central bank will ever want to create large amounts of money on which it has no control. The appeal of SDRs, that they are not controlled by any national central bank, is also their fundamental weakness.

Over the years, some currencies are likely to achieve international status. A key requirement is that they be issued by a large country. The Chinese yuan and the Indian rupee naturally come to mind. These are very long term propositions. Not only must these economies grow considerably bigger, which they are likely to do, but they must also develop large financial markets, fully integrated in world exchanges, and their governments must issue top-rated public debt instruments. At this stage, neither the yuan nor the rupee are fully convertible, and the Chinese and Indian financial markets are not integrated. Nor, for various reasons, the financial credibility of their authorities is limited.

There are fears that a multi-polar system will be unstable. The idea seems to be that asset holders might be tempted to zap between reserve currencies. Just as depositors can run on banks, individual central banks would trigger runs on a particular reserve currency as soon as they would be concerned about safety, or just returns, possibly even for political reasons. The experience so far, with two reserve currencies, does not bear out these fears. Central banks, at least the large ones, behave prudently because they stand to be the first to suffer capital losses from a rapid shift in the currency denomination of their reserves. There is a strong case to be made for the global village to have a global currency issued by a world central bank. But who will this central bank report to? Until this question is answered, our monetary world will not look very different from the current one.

### 4. Capital Controls and Exchange Regimes

#### **-Advocacy of Capital Control.**

In a number of recent papers, the IMF has come out advocating of capital controls under certain circumstances to reduce the volatility of capital inflows (Ostry et al. 2011A and B; Habermeier

et al. 2011). This break with the long-standing tenet of free capital mobility at the IMF reflects the growing concerns that global investors have become increasingly prone to displaying excessive optimism or pessimism and herding as they often overreact to market developments—both favorable and unfavorable. This overreaction often poses danger of amplifying procyclicality of capital inflows to create bubbles and set off an asset market boom-bust cycle as it often in emerging economies.

Faced with this potential damage inflicted by a sudden surge in capital inflows, the Fund argues, policy makers in emerging economies may be justified in imposing controls on those flows—in particular risky forms of foreign borrowing—to prevent a large and unsustainable appreciation of the exchange rate and to fend off a currency or banking crisis that may ensue. While implementation of monetary, fiscal and macroprudential policies should always be the first line of defense, Ostry et al. (2010, 2011) argue that the damage inflicted by a sudden surge in capital inflows, the Fund argues, policy makers in emerging economies may be justified in imposing controls on those flows. In order to moderate capital inflows, policy makers in emerging economies may impose taxes and unremunerated reserve requirements (URR) and special licensing requirements on external borrowing. More drastic measures would include outright limits or bans on foreign borrowing. Capital controls may cover all or differentiate between different forms and maturities of flows—bond, equity, FDI, and short-term vs. long-term instruments. For instance, Shin and Shin (2010) make a distinction between core- and non-core banking sector liabilities. The latter is defined as the sum of foreign exchange liabilities and wholesale bank funding, which they find a good indicator of the vulnerability to a crisis—a collapse in the value of the currency and a credit crisis.

Ostry et al. (2010, 2011) are also specific—and restrictive—about the conditions under which capital controls may be called for and effective at the same time: If a country has an adequate level of reserves, its exchange rate is not undervalued, and it is faced with transitory flows, “then use of capital controls—in addition to both prudential and macroeconomic policy—is justified as part of the policy toolkit to manage inflows”.

### **-Procyclicality of Capital Flows**

It is well documented in the literature that capital flows are procyclical as they are positively and highly correlated with output growth in emerging economies (Kaminsky et al. 2005; Shin 2010). In a global economy which has seen a sharp increase in the volatility as well as the volume of cross-border capital movements as a result of deeper integration of financial markets of individual economies both at the regional and global level, financial disruptions in one country could easily spill over into neighboring economies including even those with strong economic fundamentals and sound financial system, thereby destabilizing their financial systems and economies. Financial market opening has combined with the collective action problem—a pervasive feature of financial industries—

to make capital flows highly procyclical in emerging economies.

When an economy enters into an upswing phase of the business cycle, financial institutions expand their lending in the belief that credit risk has decreased. Since traditional retail deposits (core liabilities) do not keep pace with asset growth, banks turn to other funding sources – domestic and international wholesale funding markets (non-core liabilities) – to finance their lending, causing a surge in capital inflows<sup>2</sup>. A large share of lending is often then allocated to the financing of housing and commercial estate, setting off a boom and a bubble in the real estate market.

The credit expansion feeds, and is often fed, by the asset market boom. The financial institutions may realize that their lending operations could indeed create an asset market boom, sowing the seeds of a bubble, which will eventually burst. It would be in their interest to restrain their lending collectively, but there is no market mechanism that could bring about such a collective action problem among financial institutions.

Eventually the expansion phase or boom comes to an end and the economy enters the contractionary phase of the business cycle. At this point, foreign lenders become concerned about credit risk and begin to recall the existing loans while refusing new credit extensions. The result is a sudden stop of capital inflows and worse yet, large capital outflows. Since all foreign financial institutions and other lenders do the same, they end up deepening the contraction.

Ostry et al. (2011a, 2011b ) consider that controlling inflows would moderate outflows of foreign capital as well, thereby mitigating the procyclicality of foreign borrowing to prevent asset market booms, bubbles, and busts. This assumption is neither warranted nor backed by evidence. Controls on capital inflows are highly ineffective in preventing the sudden stop or reversal of the flows, unless they are accompanied by controls on outflows. This is because when foreign lenders and investors deleverage and head to the exit during the downturn phase of the economy or in response to, for instance, adverse external shocks such as the euro-zone debt crisis, the size of potential capital outflows is given by the *existing stock* of foreign liabilities

When the economy cools off, the subsequent fall in risk tolerance, the tightening of financing constraints and the plummeting of asset prices, which are often the sources of the market by controls on outflows. This is because when foff credit lines and to refuse to roll over short-term loans. Foreign investors may cash in their holdings of bonds and equities. Depending on the steepness of the downturn, emerging economies may lose access to global wholesale funding markets. As a result, these economies are likely to experience shortages of reserve currency liquidity. Withdrawing controls on capital inflows, as proposed by Ostry et al. (2010, 2011), may succeed in discouraging the outflow of foreign capital that was subjected to capital control at its entry, but it may not prevent the

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<sup>2</sup> Hahm, Mishkin, Shin and Shin (2010) use disaggregated series by non-core liabilities in Korea to find that, relative to core liabilities, non-core bank liabilities are more procyclical on various measures



outflow of a broad category of other existing foreign liabilities and foreign investments in domestic equities. This reversal in capital inflows may dictate intervention to control outflows of foreign capital. That is, if there is a need for controlling capital inflows, there is also the need to control capital outflows. Capital controls should be deployed as a *countercyclical* policy. As argued below, however, there are no effective measures for capital outflows

Some of the capital control measures introduced by a number of emerging economies suggest that they may not be effective in reducing the aggregate volume, but they lengthen the maturity of inflows<sup>3</sup>. But this does not mean that the inflow control could slow down outflows during the downturn phase of the business cycle. This is because controls on inflows may lengthen the maturity of *new* inflows, but not that of the *stock* of existing external funds, which is likely to dwarf the former in the short run after capital controls are imposed.<sup>4</sup> In addition, investors exposed to a country risk may hedge by taking short positions, which is equivalent to capital flows (see Dooley, 1996).

### **-Effectiveness, Instruments, and Scope of Capital controls**

The effectiveness, instruments, scope and intensity of capital controls as a means of moderating capital inflows have long been – and will continue to be – instruments, scope and intensity of capital controls as a means of moderating capital inflows have long been – (Dooley, 1996). Controls on inflows may lengthen the maturity of the re-imposition of controls by countries that already have largely open capital accounts.

Controlling outflows is not easy to implement in the short run. Furthermore, if investors expect that outflow controls will be implemented during a sudden stop episode, foreign investors may choose even shorter maturity or avoid altogether the country as destination for investment. This is one reason why emerging economies whose currencies are not internationalized accumulate foreign exchange reserves to deal with shortages of reserve currency liquidity sudden capital outflows.

The danger is that emerging economies will rely on rules of thumb based on past experiences of other countries and adopt disparate control systems, which is bound to encourage regulatory arbitrage. It is important therefore that the G-20, in cooperation with the IMF, sets the rules and conditions under which capital controls can be activated.

Controls on inflows are of little use in taming capital outflows, in particular in time of a crisis. During the 2008 global financial crisis, the markets overreacted to the deteriorating conditions, creating liquidity crises in both developed and emerging economies. When an economy is engulfed in a crisis, free floating often fails to serve as a first line of defense, because a large depreciation of the

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<sup>3</sup> In the case of Chile and Colombia, De Gregorio et al. (2000) and Cardenas and Barrera (1997) show that controls had some success in tilting the composition of inflows toward less vulnerable liability structures.

<sup>4</sup> This point is also made by Calvo (2010).

exchange rate triggered by outflows could put it on an implosive trajectory.

In a crisis situation, global wholesale funding market is likely to freeze up, international commercial banks may refuse to rollover their short-term reserve currency loans to emerging economies, which could suffer more if foreign investors dump their holdings of securities at a loss. In 2008, Korea offered government guarantees to foreign lenders and withdrew withholding tax on foreign holdings of domestic bonds to stem the tide of capital outflows, but to no avail (Park 2009).

When some signs of recovery from the liquidity crisis triggered by the Lehman Brothers collapse appeared, once again large amounts of foreign capital started flowing into the Korean economy. Concerned about the consequences of these inflows, Korea's policy makers imposed three measures of capital inflow control: caps on foreign exchange forward positions of domestic banks and branches of foreign banks in October 2010<sup>5</sup>, a withholding tax on interest income (14 percent) and capital gains (20 percent) from foreign investments in domestic bonds in January 2011, which had been exempted in 2008 and macroprudential stability levy on August 2011.

It is too early to analyze the effects of these measures-in particular those of macroprudential stability levy largely because of the deleveraging of European lenders and investors with the deepening of the euro-zone debt crisis that has complicated empirical analyses more. The effect of the withholding tax started biting two months after the imposition and lasted for about five months. During this period, however, much of the effectiveness of the tax was offset by a surge in equity inflows (Park 2012).

These experiences suggest that most emerging economies cannot prevent by themselves unexpected and speculative reversal of capital inflows. This opens up an important role for the G-20. A solution would be the adoption of macroprudential controls on capital outflows by acting at the source, focusing on lending to emerging economies by large global financial institutions. One solution would be to relate capital requirements to the exposure to emerging economies. Such a control system at source may reduce the burden of imposing capital controls on the part of emerging economies, make it easier to monitor flows of international short-term lending, and possibly stabilize such lending.

The G-20 may also establish a system of gathering and assessing information on capital movements between regions ibly stabilize such lending. e G-20. A solution would be tmies to prepare

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<sup>5</sup> Banks sometimes fund their long-term won-dollar forward positions by borrowing US dollars short term to avoid the foreign exchange risk. The interest rate differential between home and foreign markets brought about a large increase in short term dollar loans to finance investments in forward dollars sold by ship builders and other domestic firms in 2011. In response Korea's policy makers imposed limits on currency forward positions by domestic banks to 50 per cent of their equity capital while restricting foreign banksnciositions to 250 per cent. On May 19 2011 the ceiling on the foreign exchange forward position by local branches of foreign banks was cut from 250% to 200% while the ceiling for domestic banks from 50% to 40%.The new ceilings took effect from June 1, with a one-month grace period until July 1.

for a sudden reversal in capital inflows. A possibility is to permit automatic access to the new lending facilities at the IMF such as FCL and PCL when signals outflows emerge. In the end there is no effective measure other than creating a global liquidity support system to cope better with the capital outflow problem, which is discussed in the next section.

## **5, Regional liquidity support arrangement : The Role of the CMIM**

The 1997-98 Asian financial crisis marked a watershed in regional economic cooperation and integration in East Asia. It brought to the fore the need for cooperation and coordination in policy among the countries in the region in preventing future crises. Realizing the need, the thirteen countries from the region that include ASEAN10, China, Japan, and Korea – a group known as ASEAN+3 – agreed to establish as a first step towards regional cooperation a system of bilateral currency swaps , which came to be known as the Chiang Mai Initiative (CMI). It was designed to provide liquidity support to the member countries suffering from short-run balance of payment problems. Two years later, they launched another program- the Asian Bond Markets Development Initiative (ABMI)-for the integration of East Asia's regional capital markets.

Since then, the thirteen countries have converted the CMI into a multilateral currency swap agreement -CMI Multilateralization (CMIM)-that covers all Asean+3 members with a total amount of \$120 billion for liquidity support. They have also put forward a proposal for doubling the size of the CMIM. The progress in the ABMI has been slow, but it has been instrumental to the creation of Asian Bond Fund (ABF) I and II, created a regional credit guarantee system, and has been exploring the possibility of constructing a regional clearing and settlement system for cross-border bond transactions. After years of discussion and negotiation, ASEAN+3 has established of the ASEAN+3 Macroeconomic Research Office (AMRO) in Singapore in 2011 whose job is expected to maintain surveillance of the CMIM and support its full operation.

Unlike China and Japan, ASEAN as a single entity and Korea could be both potential lenders to and borrowers from the CMIM. As relatively small open economies, they would benefit more from regional economic stability. They could serve as mediators between China and Japan on a wide range of issues on which the two countries cannot agree. Not surprisingly, there was a general consensus that they should play an active role in promoting ASEAN+3 as framework for regional integration in East Asia.

However, the 2008 global financial crisis has changed this view. It has prompted calls for a review of exchange rate policies and on the strategy for regional financial and monetary cooperation within ASEAN+3. In fact, the financial crisis of 2008 was the first opportunity to test the effectiveness of the CMIM. The outcome of the test has not been reassuring. Although it was in dire need for liquidity in 2008, Korea simply did not consider approaching the CMIM for a short-term loan.

In fact none of the ASEAN+3 members suffering from a liquidity draught did, because the amount of liquidity that could be drawn was too small to impress currency speculators and worse yet was not available immediately because of the cumbersome drawdown procedure. Neither China nor Japan was prepared to offer any liquidity assistance.

From the beginning, the leadership problem stemming from the lack of cooperation between China and Japan change rate policies and on the strategy for region eye on many regional issues – has constrained the role of ASEAN+3. It has hampered the expansion and consolidation of the CMIM. It has become more tenuous with the rise of China as a global economic power, making cooperation between China and Japan more complicated and hence casting doubt on the future viability of ASEAN+3. In this setting, ASEAN and Korea finds a dwindling room for acting as a mediator reconciling the conflicting interests of China and Japan.

The 2008 global financial crisis appears to have diminished interest in regional monetary and financial cooperation among the members of ASEAN+3. Not surprisingly, implementation of the two main initiatives under the ASEAN+3 framework tegy for regioo eye on many regional issues y as constrained talso true that many of the structural weaknesses of the Eurozone that were laid bare by the systemic risk posed by the sovereign debt crisis and the lack of consensus in supporting members under extreme market pressure have made the ASEAN+3 members rethink the merits and viability of regional monetary cooperation in East Asia with a greater degree of heterogeneity among the countries than in Europe. There have also been other regional developments that have contributed to weakening and reducing the scope of the integrationist movement in East Asia.

As the second largest and most advanced economy in the region, Japan was at the forefront of coalescing regional efforts for economic integration. It was Japan, which advocated the creation of an Asian Monetary Fund during the 1997-98 Asian financial crisis. Japan also took the leadership in launching the ABMI and in promoting the introduction of a regional currency unit a la Ecu as a means of stabilizing bilateral exchange rates of ASEAN+3. But in recent years plagued by deflation, strong Yen, slow growth, and political instability Japan has been relinquishing its role as a leader of economic integration in East Asia.<sup>6</sup>

China can and should provide leadership for expanding and consolidating ASEAN+3 as a framework for regional economic integration, but it has been increasingly preoccupied with its global role. China's policymakers may see little benefits to be drawn from participating in East Asia's regional integration<sup>7</sup>. Perhaps for this reason together with the fact that China has become a major trader with an increasing financial clout, it has shown more interest in global than regional issues such as the reform of the international monetary system.

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5. A recent empirical analysis by Park and Song (2010) shows that among the East Asian economies, China is likely to benefit the least from regional monetary integration.

As Eichengreen (2009) points out, China might not have to participate in or lead promotion of any regional arrangements to attain greater political and economic influence in the region. Instead of trying to emulate the European approach to regional integration, all it has to do is “wait”aitichengreen (2009) points out, r will be its economic position in the region. The huge export market it presents to other member states of ASEAN+3 will induce them to integrate with China. The RMB will eventually emerge as East Asiaem to integrate with China.n or lead promotion of any rill do more than just wait. Although it will be reticent in regional integration at the level of ASEAN+3, it will be much more active in deepening its economic relations with ASEAN, which China regards as its natural and rightful sphere of influence with strategic interests. As discussed below, this will be the most conspicuous development

Regional arrangements such as the CMIM could be an important component of the global liquidity support system, but little is known on how it should be structured and managed to be a reliable source of short-term liquidity. The G-20 may address viability of establishing similar arrangements in other regions. But before endorsing other regional arrangements, the G-20 may need to undertake a review of the size and operational details of the CMIM together with its linkage with the IMF to determine whether it could be an effective regional mechanism.

Now that the EU has decided to construct the European Stability Mechanism (ESM), which can be seen as a sort of European Monetary Fund operated independently from the IMF, new questions will arise as to what type of the linkages of these regional institutions with the IMF would be appropriate and how their activities could be coordinated to consolidate and improve efficiency of the global safety net. The G-20 may need to undertake a review of the size and operational details of the CMIM together with its linkage with the IMF to determine whether it could be an effective regional mechanism.

## **6. Swaps among Major Central Banks**

One of the lessons of the 2008 financial crisis is that global financial markets are highly susceptible to the failures associated with information asymmetry. Overreaction—euphoria or excessive pessimism—and herding of market participants can trigger uncontrollable chain reactions, including the sudden reversal of capital inflows that can provoke a liquidity crisis. Fears of such liquidity crises have been one of the reasons for holding large amounts of reserves for self- insurance in emerging economies, as shown in Figure 2. It would also alleviate somehow the need for capital controls.

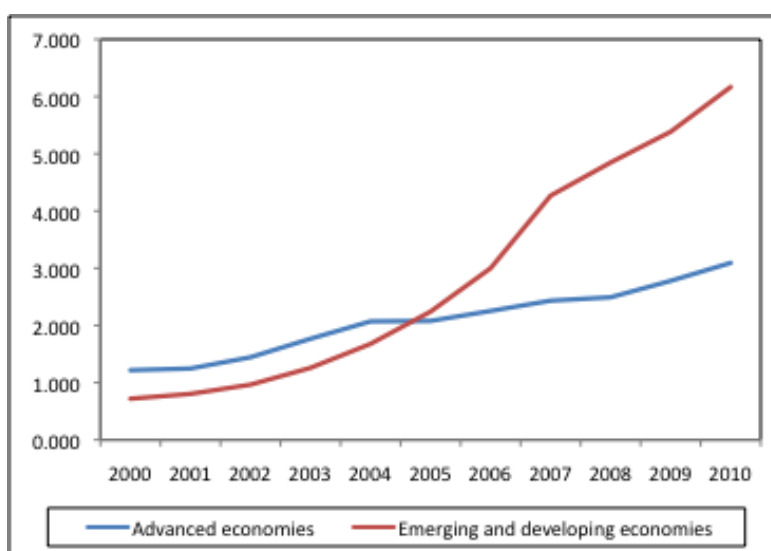
Imagine that a global central bank is created and that it assumes the role of lender of last resort. It would make sure that liquidity in the global economy is adequate, that the prices of globally traded assets are not too volatile and it would see to it that liquidity crises do not occur. It would also

prevent runs on banks—at least the systemically important ones<sup>8</sup>. Since it is highly unlikely that the global economy will be ready for a global central bank anytime soon, a second best solution needs to be found, and this should be a global liquidity safety net. In addition to its role during a crisis, a global safety net could alleviate the fear of being afflicted by liquidity shortages.

Of course, we already have a global safety net, the IMF. One problem that undermines the IMFk anytime soon, a second best solution needs to be frience nd this should be a global liquidity safety net. In addition to its role during a crisis, a gloAnother problem is that liquidity can vanish extraordinarily quickly, as the 2008 crisis has shown. Support must therefore be available in a matter of days, sometimes even less than a day. This is impossible if an agreement must first be negotiated with the IMF and then approved by its Board.

**Figure 2. Foreign exchange reserves (US\$ trillion)**

Source : COFER, IMF



The IMF has fully recognized these shortcomings. In response, it has created three new facilities: Flexible Credit Lines (FCL), Precautionary Credit Lines (PCL), and High-Access Standby Arrangement (HAPA). The FCL can be disbursed very fast a gloAnother prargely designed for liquidity crises – and has no conditionality attached to its loans, but it requires pre-qualification, based of high standards of policymaking. Three emerging economies have qualified so far (Colombia, Mexico and Poland) and many others would if they applied. The PCL, which also requires pre-qualification, concerns countries that do not quite qualify for a FCL and has limited conditionality

<sup>8</sup> The IMF uses a definition of global liquidity which is a sum of GDP-weighted M2 or reserve money for the four reserve currencies—the U.S. dollar, the Euro, the Japanese yen, and the U.K. sterling pound (IMF 2010). For recent discussions on global liquidity see also BIS (2011) and IMF (2011A).

with fast disbursement. HAPA is available for countries that do not quite meet the PCL criteria and is an accelerated standard standby arrangement available to prequalified countries (Costa Rica, El Salvador, and Guatemala have been approved).

Do we need more or other arrangements? One problem with the existing ones is that a stigma effect is attached to anything that looks like having to borrow from the Fund, and this has deterred further applications. This stigma effect is likely to wear out over time and there could be a collective effort, for example within the G20, to encourage more applications, including from the developed countries since they have discovered that they are not immune from requiring IMF help. A more serious problem concerns the amounts available from the IMF. Globalization means that the size of financial markets has grown at a steep slope over the last decade. The need for emergency liquidity has grown in proportion, in fact more. The possibility for investors to take huge negative positions means that liquidity needs may become near-infinite.

Stigma and near-infinite needs explain why a number of central banks have agreed swap arrangements following the Lehman Brothers failure. As Table 1 shows, in 2008, the Fed established currency swap lines of unlimited amounts with the central banks of the Eurozone, the UK, Japan, and Switzerland. Later in 2009, six more central banks of advanced economies were added to the list. The Fed also offered swap lines to the central banks of four other emerging economies- including Brazil, Mexico, Singapore, and South Korea.

In September 2011, the Federal Reserve and other major central banks agreed to auction allotments of dollars to the European Central Bank, which would then use the new money to support large European banks suffering from shortages of were to be issued against euro-denominated collateral and repaid, with interest, in dollars. The Managing Director of the IMF welcomed this coordinated decision by saying “the path to recovery needs collective action by both political leaders and central banks. What we saw today was exactly what is needed. It shows central banks will do whatever it takes to restore stability” (IMF 2011B).

Korea was one of the four large and systemically important emerging economies that established swap lines with the US in October 2008<sup>9</sup>. The arrangement was limited to \$30 billion, however. Korea also enlarged previously agreed swap arrangements with Japan and China, to \$70 billion and 360 billion yuan, respectively. Park (2011) argues that the Fed-Bank of Korea swap, although of limited size, stopped the run on the won because it was provided by the *de facto* global lender of last resort. This raises the question whether a similar support (in terms of size and availability) provided by the IMF could have been as effective.

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<sup>9</sup>Korea has become one of 14 countries having such a temporary reciprocal currency arrangement with the U.S

**Table 1. Swap arrangements during the crisis (USD Million)**

	11/09/11	Operations during week ending 11/16/11			11/16/11
	Outstanding (A)	Matured (B)	Drawn (C)	Terms*	Outstanding (A-B+C)
Bank of Canada	0	0	0	N/A	0
Bank of England	0	0	0	N/A	0
Bank of Japan	2	2	1	7-Day, 1.1%	1
	100	0	0	N/A	100
European Central Bank	505	505	500	7-Day, 1.08%	500
	1,353	0	395	84-Day, 1.09%	1,748
Swiss National Bank	0	0	0	N/A	0
<b>Total</b>	<b>1,960</b>	<b>507</b>	<b>896</b>	<b>N/A</b>	<b>2,349</b>

- A. Total value of swaps that has been settled, but has not yet matured as of, and including, the date at the top of the column.
- B. Total value of swaps that was unwound during the week. The "week" begins on the business day immediately following the date referenced in A through the week ending date.
- C. Refers to the total value of swaps which have settled during the week, but have not yet matured.
- D. Annualized interest rate of the transaction. Only includes terms for transactions referred to in "C".

Source: Board of Governors of the Federal Reserve System. 'Central bank liquidity swaps'. <[http://www.federalreserve.gov/monetarypolicy/bst\\_liquidityswaps.htm](http://www.federalreserve.gov/monetarypolicy/bst_liquidityswaps.htm)>

These swap lines were set up in emergency. None of the participants apparently considered applying to the IMF. Stigma was certainly a powerful motive. Indeed, the mere knowledge that, say, Switzerland was asking for IMF support could have triggered a massive, quite possibly fatal, run on its two large banks. It must also be the case that the resources of the IMF were deemed to slim for the task.

The fact that these arrangements were put in place quickly and worked efficiently may suggest that there is no need for further reform in this direction. This would ignore that the agreements only concerned advanced countries, with the sole exception of Korea. As globalization deepens and as emerging economies grow, more and more countries may need to establish swap lines with the providers of international currencies. How could that be organized?

**-A cooperative arrangement among major central banks**

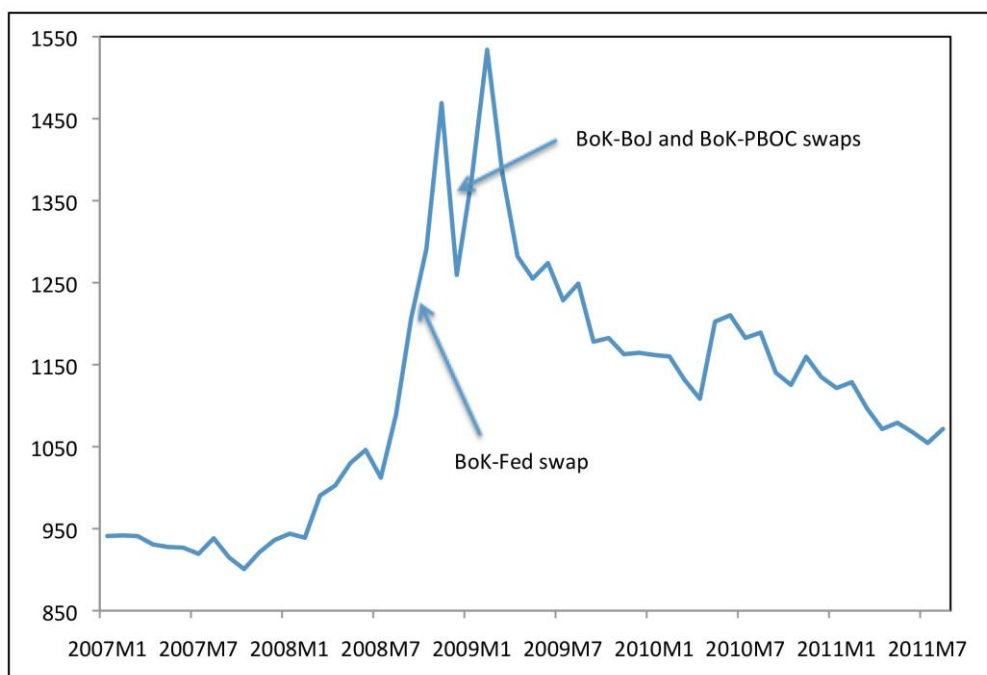


The swaps will involve providers of liquidity and countries that are potentially users. One lesson of the crisis is that today's reform in this direction. This would ignore that the agreements only concerned advances should be understood to work both ways. The swaps should concern currencies that are used in financial systems since the purpose is to keep up short-term borrowing by banks and financial institutions when private lenders suddenly withdraw. For many years to come, the US dollar and the euro—assuming that it will survive the ongoing crisis—assuming that it will survive the ongoing crisis—countries that the yen and the Swiss franc play a non-negligible role. This implies that the Fed and the ECB will serve as the *de facto* global lenders of last resort and providers of emergency liquidity, alongside the Bank of England, the Bank of Japan, and the Swiss National Bank. Other central banks will join either because they hold large reserves that they are willing to mobilize, or because their own financial systems may face sudden stops. The list could include the central banks of Canada, Australia, and New Zealand, and, of course, the central banks of emerging economies that are active in international finance.

The swaps could be permanent agreements or they could be activated at time of emergency along an agreed-upon template. The key issues are: amounts, maturity and interest rate. Maturity and interest rates could be similar to those for the IMF's mobilize, or swaps are meant to complement because of the required size. Indeed, in principle, swaps are most effective when they are provided in unlimited amounts because this is what it takes to convince the markets that the situation is under control. On the other hand, unlimited swaps raise serious moral hazard issues, to which we return below. It is interesting that, in the case of Korea in 2008, the amounts were limited and not even very large, and yet they seem to have been effective.

Park (2011) shows that the won turned around after the Fed offered a swap to the Bank of Korea. This is strong evidence but we know that markets are forward-looking and that they often need some signal to coordinate divergent expectations. An alternative interpretation of this episode runs as follows. By the time of the swap agreement with the Fed, in October 2008, the won had already suffered a severe depreciation, and it was clearly undervalued. The markets must have expected a turnaround. The agreement probably started to reinforce this impression, and yet the won kept depreciating, see Figure 3. A month later, a first rally occurred but fizzled out. A couple of weeks later swaps with Japan and China were concluded and yet the won depreciated again until, finally, it started a durable appreciation phase. It is not clear at all whether the end of depreciation came because of the swap agreements or because “what goes up must come down” (a correction of sharp undervaluation). At the least, the limited swaps did not produce immediate effects, as one sees when the commitment is unlimited.

**Figure 3. The won-dollar exchange rate**



Source: Bank of Korea.

If the G20 countries were to take the initiative and establish swap agreements among themselves, it would send a clear signal member countries are prepared to avert any impending liquidity crisis.. Naturally, there is a moral hazard concern. A liquidity backing could reduce discipline in managing macroeconomic policy and in overseeing banks and other financial institutions. Clearly, some guarantee will be required. This brings us back to the IMF's pre-qualification process of the FCL and PCL facilities. This observation suggests that unlimited swap agreements could be associated to these facilities. Pre-qualified countries would have access to a first line of defense, the IMF facilities, in case of external imbalances and to unlimited swaps in case of liquidity withdrawal.

## **7. Enhanced G20 cooperation**

In 1971, Treasury Secretary John Connolly is said to have disappointed his colleagues by telling them that US monetary policy only concerns itself with US domestic considerations. Forty years later and following the creation of the G20, has the situation changed? Brazilian claims that the US is waging a currency war through QE2 elicited exactly the same answer from the Fed. On the other hand, successive G20 Summit show European leaders under pressure from their peers to take more determined steps to deal effectively with the sovereign debt crisis.

In fact, an early decision by the G20 has been to ask the IMF to play some referee role in dealing with exchange rate disputes. In practice so far, the IMF has been asked to examine whether

the Chinese yuan is overvalued and it conducts a yearly Mutual Assessment Process (MAP) exercise that seeks to outline what optimal policy coordination could be. This is meant to be soft coordination, relying primarily on peer pressure.

Before each G20 Summit, the IMF releases a series of MAP documents. In preparation for these documents, the G20 authorities provide the IMF with their own forecasts of main macroeconomic developments, directly related to their current and anticipated policy decisions. The MAP reports provide a critical evaluation of these forecasts. They also evaluate the policies from the angle of international cooperation and make pointed suggestions to those countries that, in the view of the “good referee”, could do more to act collectively. The recent MAP reports are fairly straightforward in their assessments. They certainly provide ammunition for any G20 member who wishes to criticize the others in the spirit of peer pressure.

Soft coordination has been experimented previously. The G7 too operated on this basis. Most assessments of the G7 conclude that it almost never succeeded in changing national non-cooperative policies.<sup>10</sup> The main exception is the 1978 decision that Germany and Japan would play the role of world economic locomotive by adopting expansionary fiscal policies because they had room for maneuver. Kenen et al. (2004) note that this high-point of international coordination continues to be debated, especially in Germany where it was widely seen as the cause of a pickup of inflation in 1979. Expansionary fiscal policies because they had room for maneuver. Kenen et al. (2004) note that the 1979 oil shock in 1979. This was the main impetus for a revival of inflation in Germany.

Another example of soft coordination is the European Union adoption in 2000 of the Lisbon ten-year strategy. The objective was to encourage countries to adopt politically difficult supply side policies, using peer pressure as a counterweight to national vested interest pressure. The strategy involved annual reports evaluated by the European Commission almost exactly in the same way as the G20 MAPs. These reports were on the agenda of annual Summits mainly devoted to the Lisbon strategy. The mid-term Kok Report (2004) warned that the strategy was not working but failed to elicit changes. By its final target date of 2010, the strategy was officially recognized as a failure (and yet it was re-launched as Europe 2020). The lesson is clear: political leaders are highly reluctant to criticize each other regarding their conducts of domestic policies.

This reluctance could be overcome if important externalities are involved. The on-going debate between China and the US on the RMB policy is one example of a perceived large externality. So far, peer pressure has been relatively low and certainly ineffective. The Cannes Summit has also illustrated the limits of soft coordination. It took place during a period of acute debt crisis in the Eurozone. In fact, apparently, the crisis overtook the agenda, which is normal since a worsening of the

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<sup>10</sup> The G7 was more successful as a tool to provide guidance in matters of international institutions, in particular regarding the IMF (its instruments and governance). This also applies to the G20, which has promptly changed voting rights and expanded IMF resources.

situation is bound to have severe global repercussions. Acute peer pressure was exercised on the Italian Prime Minister who accepted IMF oversight, without applying for a loan and signing any agreement. Yet, none of the crucial decisions to be taken by the Europeans has been taken, either during or after the Summit. In particular, the ECB, which arguably holds the key to ends the crisis, was either not pressured or able to resist pressure. The euro is your problem is probably the answer given by the ECB President who attended the Summit meeting.

Because of its historical importance, this particular event encapsulates most of the important issues of international cooperation. In an ideal word, the Summit would have articulated publicly before the meeting the steps that it deemed necessary to be taken by the Europeans to stop the debt crisis and the Europeans would have committed to follow these recommendations. This would have required either that some non-Eurozone countries prepare the required document, or that an independent secretariat makes a proposal. The earlier route is arguably intrusive, but the latter one exposes one of the sources of weakness of the situation. The G20 does not have any secretariat of its own, intentionally so. The IMF's MAP report could have played that role, but stayed well away from taking such a step. This left the Leaders with the responsibility of deciding how far they would go with peer pressure.

Without clear view on what it would take to solve the European debt crisis, they limited their mutual criticism to confronting Italy, which was at the time in acute crisis. They did not even press the Italian leader for explicit commitments but delegated the task to the IMF. Enhanced monitoring of Italian policies is unlikely to be needed for the IMF to formulate policy recommendations. The gesture is more symbolic than practical and, quite possibly, hastened the downfall of PM Berlusconi. Thus peer pressure had a political impact, but did not result in a well thought through design of policy cooperation. Proper use of the G20 should instead involve policies, not indirect impact of national politics, no matter how justified there are. If anything, this will make the G20 Leaders more prudent in the future with each other.

The experience with the G20 so far confirms what we learned from the G7 experience: it is most unlikely that soft coordination can be effective. Growing interdependence implies that the externalities are becoming more numerous and more sizeable, and therefore enhances the case for policy coordination. Effective coordination means that individual countries accept to carry out policies that they would not choose otherwise. This can be in their best interest because of externalities, but internalization is often perceived as a loss of sovereignty. In fact, a systematic internalization of international externalities actually is a loss of sovereignty. Examples of successful systematic internalizations that raise global welfare include WTO membership and Europeis most unlikely thaich take the form of international treaties that are binding national legislation.

As far as macroeconomic policies are concerned, in the absence of hard coordination that takes the form of international treaties, softer coordination among sovereign nations requires rules and

procedures. The reason is that *ad hoc* responses to particular problems are concerned, in the absence of hard coordination that takes the form of international treaties, softer coordination among sovereign nations requires rules and procedures. The reason is that even IMF membership. The IMF has accumulated considerable expertise and has real time information on the macroeconomic situation in its member countries. It can make recommendations but these are rarely taken to heart in the absence of conditionality. In fact, the influence of its recommendations seems inversely proportional to country size, because we do not have rules.

On the other hand, a number of countries can be labeled systemically important. Policy errors in the Eurozone stand to impose major costs to the global economy. The US Fedon requires rules and procimportant externalities worldwide as is China's huge savings rate. A sovereign debt crisis affecting the Japanese debt will have important ramifications. In the decades to come, this group of systemically important countries (SICs) stands to expand. These are the countries for which transaction costs of effective coordination are likely to be smaller than the global costs of policy errors. The SICs must be subject to rules and procedures.

Like the G7 before, the G20 is a self-appointed group that pretends to exercise world leadership. As such, it lacks legitimacy. Its leadership would be more acceptable if membership came along with explicit responsibilities toward the rest of the world. It would seem natural, therefore, that G20 membership entails the acceptance by its member countries that they are deemed SICs and, as such, that their economic policies are a matter of interest to all countries. This could lead to re-adjustments of G20 memberships as some countries might choose not to accept to be bound by collective decisions.

The MAP exercise has given the IMF some authority to make recommendations to the G20 countries, and therefore to the SICs. Three more steps are required. First, these recommendations should be presumed to be binding. At present, the G20 leaders may or may not debate the MAP reports. In practice, it seems that each one uses selected parts of these reports to buttress his/her views and chooses to ignore the parts that he/she does not like. The procedure could be changed by requiring that the Fund's Managing Director present recommendations that each member country would, in principle, be asked by the peers to follow. Obviously, these should not be the routine observations that are currently cluttering the MAP reports. The recommendations should concern systematically important risks.

Second, the IMF should be made more independent than it currently is. Suggestions to that effect are presented in De Gregorio et al. (1999). Currently, the Executive Board members are explicitly representing their governments. This makes the Board highly politicized and subject to the criticism that developed countries holds excessive power. The result is the zero-sum-game, and therefore conflictual discussions about redistribution of voting rights. An independent IMF would be depoliticized and judged *ex post* on the quality of its work. This would be achieved by making the

Board similar to central bank boards. Clearly, then, the Board should be accountable to the Fund membership. This would require turning the IMFC into a supervisory board that would meet regularly, say once every three months, to listen and discuss reports from the Managing Director, the *primus inter pares* of the Executive Board.

Third, the Fund's Board. This would be achieved by making the Board similar to central bank boards. Clearly, this numerous successes but also some important mistakes. In response to its widely criticized interventions during the Asian crisis, the IMF has set up the Independent Evaluation Office (IEO), which has produced a string of good reports, which have often pinpointed serious policy errors. These reports, however, do not have consequences. Raising the status of the IEO and linking Board members to its findings stands to inject more self-criticism in the organization.

## 8. Concluding Remarks

At this juncture of the debate on the reform of the international monetary system, few proposals seem appealing and agreeable to both advanced and emerging economies alike. Even some of the countries such as France, which have been at the forefront of leading the reform, are no longer as vocal as they were before. Paradoxically, the dollar's role as the dominant reserve currency has been reinforced as the euro-zone economies are struggling to keep the single currency arrangement alive. The dollar is the worst international currency, except for all the others. Not surprisingly, the talk of elevating the status of the SDR has been going nowhere. The BRICs countries meet on and off to advance and articulate their causes including the creation of a BRICs development bank, but seldom agree on anything of substance. The leaders of ASEAN+3 will continue to promise a bright future of regional economic integration in East Asia against their poor batting record. In this confusing state of global economic affairs, the IMF has made inroad into bringing itself back onto the center stage of global economic management.

The future of the international monetary system will hinge a great deal on the prospects for recovery in the euro-zone. If the euro-zone economies emerge from the on-going crisis with regained competitive strength, the discussion on the reform of the international monetary system and the need for the G-20 process will fade away as the world currency arrangement and economic management will be shaped by a three-polar system consisting of the US, China, and the euro-zone. On the other hand, if the euro-zone crisis drags on as expected, both advanced and emerging economies will not have any choice but to turn to the G-20 summit as the only international forum where they could agree on what is to be done, although few of their decisions will be enforceable. In this state of confusion and uncertainty the global economy will muddle through without knowing where it is going. Only when it hits an iceberg as it did in 2008, the G-20 leaders will sober up and restart the reform of the international monetary reform.

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## Session 1

# International Monetary System Reform



### Presentation 2

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Yoon Je Cho is Professor of economics at the Graduate School of International Studies (GSIS) of Sogang University. His previous positions include Economic Advisor to the President of the Republic of Korea (ROK), ROK's Ambassador to the United Kingdom, Dean of GSIS of Sogang University, Vice President of the Korea Institute of Public Finance (KIPF), and Senior Counselor to the Deputy Prime Minister and Minister of Finance and Economy. He worked at the World Bank and the International Monetary Fund (IMF) as an economist before he returned to Korea in 1993. He also taught at Georgetown University as an Adjunct Professor. In 2011, he served as a member of High Level Panel for Infrastructure Investment for the G20 Summit Meeting. Professor Cho received his B.A. in economics from Seoul National University and Ph.D. in economics from Stanford University. Professor Cho has published widely in the areas of the liberalization of the financial system, financial crisis, financial sector development and reforms, and Korean economic development.

## International Monetary System Reform and the G20

### 1. Introduction

International monetary system (IMS) usually refers to the rules and institutions for international payments. It refers to the currency/monetary regimes of countries, the rules for interventions if an exchange rate is fixed or managed in some way, and the institutions that back those rules if there is a problem through official credits, controls, or parity changes (IMF 2010a). There have been intensive debates, especially since the broke-out of the global financial crisis in 2008, on the problems and reform of IMS. Many people have argued that the current IMS is no longer adequate to meet the needs of a complex, integrated world economy and it may even have exacerbated instability rather than contain it. Others have argued that although the current system is not an ideal one, it is hard to find a better alternative given the political and economic reality in the current world. Some others have argued that flaws in the IMS had little to do with the global financial crisis or the current European coda directly.

In fact, the current IMS has survived for over forty years, underpinning strong growth in GDP, international trade and capital flows. But the system also revealed many symptoms of instability—frequent crisis, persistent current account imbalances and exchange rate misalignments, volatile capital flows and currencies, and unprecedentedly large reserve accumulation (IMF 2011). At the same time, the “post-Bretton Woods” system has undergone many crisis since its birth. It is something of a “non-system” or a decentralized system. After the collapse of the Bretton Woods system in 1971, the world has divided into two camps – one with major currencies that float freely and permit free flows of capital, and one with varying degrees of control over exchange rates and cross-border flows (Mateos Y Lago et al. 2010). The current IMS does not have any established mechanism to facilitate the adjustment of global imbalances, and so they persist, becoming a source of increased uncertainty and instability.

The most commonly pointed problems of the current IMS can be summarized as follows.

First, the demand for foreign reserve accumulation has been increasing despite the movement from fixed exchange rate regimes to floating rate regimes some 40 years ago. While the collapse of the Bretton Woods system was expected to lead to smaller holdings of foreign reserves, we have in fact seen a rapid rise in them among EMEs, especially after the Asian financial crisis of 1997–98. After largely depleting their reserves during the 1980s and 1990s debt crisis, emerging market economies started accumulating reserves aggressively, doubling the reserves-to-GDP ratio every decade. The dispersion in reserve holdings across EMEs has also risen, with the difference between

the top and bottom quartiles widening from 3 percent of GDP in 1990 to 13 percent of GDP by 2010. As such, there is considerable time series and cross sectional variation in reserve holdings. Despite the fact that major surplus economies have slowed reserve accumulation since mid-2011, levels remain relatively high and often exceed simple measures of reserve adequacy. If this trend continues, it is expected that total foreign reserves in dollars held outside the US will rise to 700% of US GDP by 2035 from the current level of less than 50% (IMF 2010a). This desire to self-insure makes perfect sense at the microeconomic level of a consumer, but it can be the source of macroeconomic inefficiencies.

Second, this increasing demand for foreign reserves has been concentrated in US dollar assets, especially public securities. To many economists and policymakers in both advanced and emerging economies, the international currency is under the control of a single country—the US. This has made it difficult for the US to achieve internal and external equilibrium. Even worse, the US has been running large external deficits for more than a decade and is now the world's single largest debtor. This is not a new problem for the country, whose domestic currency is used as an international currency under the fiat money system. But this problem has become more acute as the US economy weakened with deepening internal and external imbalances.

Third, as the IMS relies too heavily on the supply of currency issued by a center country (the US), it gives an exorbitant privilege to this country, which can issue treasury bills at the lowest possible interest rate in the international capital market (Mateos Y Lago et al. 2010, Subacchi and Drilfill 2010, IMF 2010a and b, UN 2009). As a result, the center country lacks any market pressure for macroeconomic policy discipline, facilitating the buildup of asset bubbles and the worsening of global imbalances. This, together with loose financial regulations, led to those in the market to seek higher yields and take greater risks in the financial system. For their part, the EMEs whose currency is not used as international currency have to bear a severe and painful adjustment when they face a currency crisis, or have to pay a steep cost in maintaining high foreign reserves for self-insurance against such a crisis. According to a recent IMF estimate, EMEs are paying about 1.3% of national income for holding large amounts of foreign reserves (assuming a 3 percentage point premium above US Treasury securities) (IMF 2010b).

Fourth, as a related problem, the global financial system depends too heavily on the center country's ability to maintain the stability of the value of its currency and strength of its own financial system. This overdependence heightens the uncertainty and source of instability. As long as the US maintains a sound financial regulatory framework, solid macroeconomic policies, and a strong and stable financial system, the system can work reasonably well. However, once US economic and financial-system credibility is weakened, the global system can become very unstable. If there were an international institution (or instruments) that could effectively monitor and govern the soundness and stability of the macro-financial policies of the US and other major economies, we might see a

more stable global financial system. However, there is not.

Fifth, international capital flows have been distorted in the current IMS. The capital flows from EMEs and developing countries where the productivity of capital investment is higher, to advanced economies, especially the US, where the return to capital investment is lower. This distortion reduces the investment opportunities for developing countries to construct their infrastructure and industrial base for higher economic growth. As such, the current IMS does not achieve allocative efficiency of international capital flow (Bush, Farrant and Wright 2011)

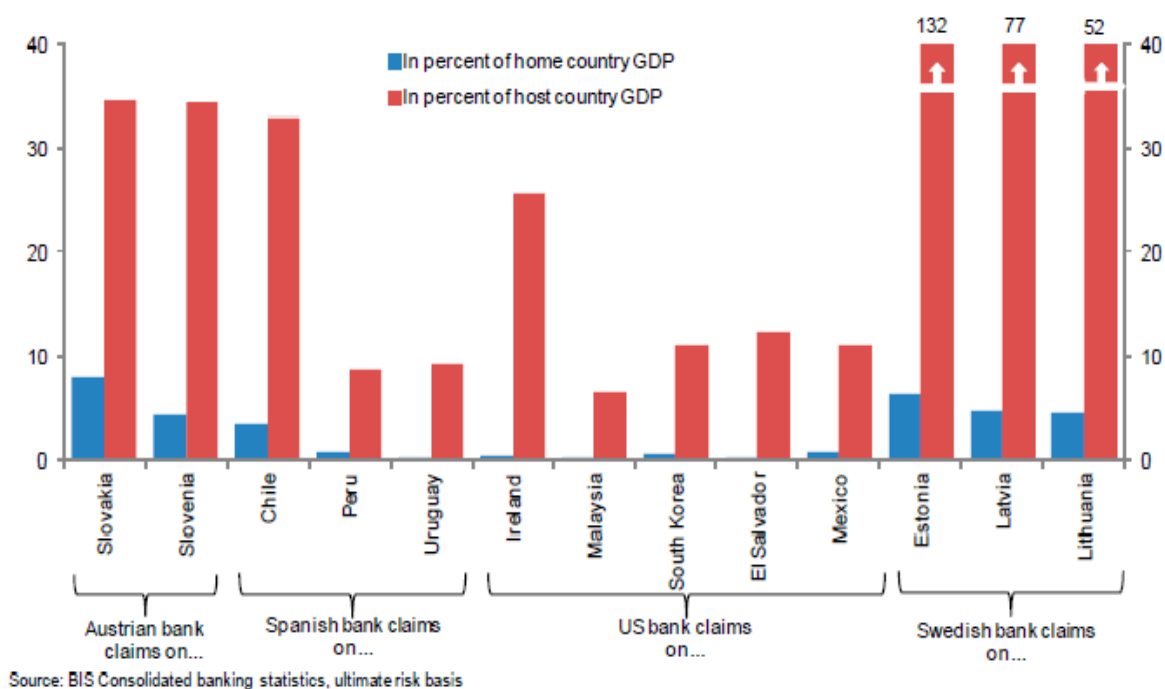
Given these problems, there have been extensive debates and various proposals to reform the current IMS. However, so far, there has been little consensus in the academic literature, or among policy makers on how and whether to reform the current IMS. Few proposals have been appealing and agreeable to both advanced and emerging economies alike (Park and Wyplosz 2012). In the meantime, IMF reform agenda has been pushed aside by the European crisis in the G20 summit meetings over the last two years.

The first section of this paper discusses the problems and reform agenda of the IMS. It reviews present debate and discussions on how to reform the IMS along with developing countries among policy makers. The second section discusses the role of the G20, which is expected to remain a premier forum for global economic governance for a while, as it is important to have effective global governance not only for orchestrating the successful reform of the IMS but for securing effective policy collaboration for balanced, stable, and sustained growth of the global economy. The third section discusses how the role of International Monetary Fund (IMF) should be strengthened to meet the current problems of the IMS. The last section concludes with brief remarks.

## 2. International Monetary System Reform: Debates, Proposals, and Prospect

Over the last 20 years, we have seen the economies with half the world of the IMS. It reviews present debate and discussions on how to into the global economic system. In addition, globalization of national economies across the world, both advanced and developing, started to accelerate in the 1990s. Emerging economies accelerated financial deregulation and opening, which led to rapid integration of their financial markets into the global market. This also led to massive – and volatile – capital inflows to these economies.

**Figure 1. Cross-border claims of BIS reporting banks, selected countries December 2009**



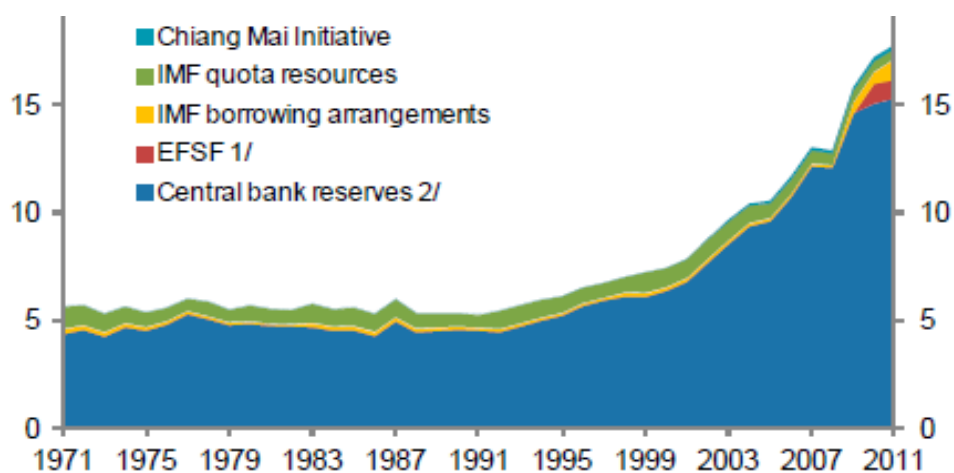
The institutions that were designed more than 60 years ago can no longer effectively meet the challenges posed by the current global economy. While the global financial market has become integrated like a single market, there is no global central bank or global regulatory body. And while global imbalances have intensified, there has been no international instrument or mechanism to drive orderly adjustments of those imbalances. Only the global crisis could stimulate the adjustment, which would impose heavy costs on the national and global economy.

There have been extensive debates about the causes of the crisis: a financial regulatory framework that encouraged excessive risk taking and high leverage in financial institutions; interconnectedness among large financial institutions in the global financial system through derivatives markets; and inadequate fiscal and monetary policies that fueled asset bubbles. and so on. From a fundamental standpoint, however, the issue starts with the institutional mismatch that failed to meet new challenges posed by the rapid globalization that progressed over the last several decades.

The global financial market has been integrated like a single market since the crisis: a financial regulatory framework that encouraged excessive risk taking. Financial institutions are competing with each other across national borders these days. Banks in Korea, Japan, Malaysia, Thailand, US, and Europe compete for the same clients. Banks in Korea, for example, have to compete with many other banks from the US, Europe, and Japan, to secure major Korean companies (which already have become global companies) as their main customers. They have to provide similar kinds of banking services to those of foreign banks so as to keep them as their customers. In the process, their balance sheets have become increasingly exposed to external vulnerability since they have assets and liabilities denominated in foreign currencies (especially the dollar) (Park 2010).

When an external shock, such as the US subprime mortgage crisis, hits, liquidity evaporates in the global financial system and banks all over the world face a severe liquidity shortage. Banks can be helped over a local currency shortage by their national central banks. However, with a shortage of foreign liquidity, central banks in EMEs are helpless. Only central banks issuing international reserve currency can bail them out, but these central banks' operations are confined to their national laws, even though the currency they issue is international. For example, the Federal Reserve issues international reserve currency but does not provide liquidity to international banks unless they are US-based. This has been one of the factors that pushed EMEs and developing countries that do not issue international currency to accumulate large foreign reserves.

**Figure 2. Global Financial Safety Net, in percent of world GDP**



Source: WEO, IFS, country authorities, and EFSF.

1/ The European Financial Stability Fund can place up to €440 billion in bonds, guaranteed by Euro area member states.

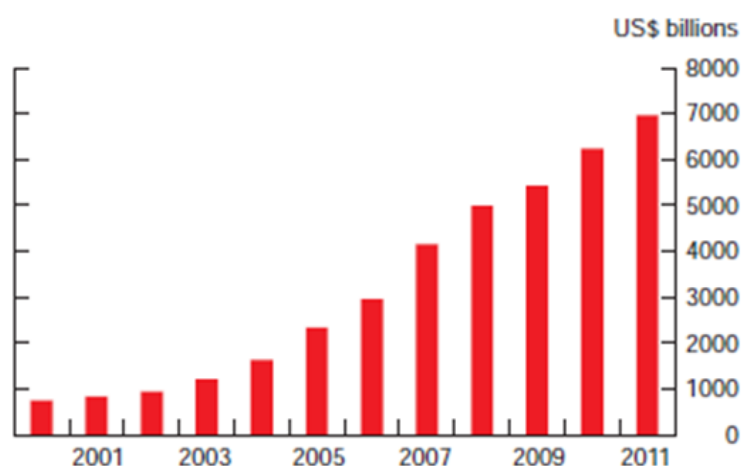
2/ To avoid double-counting, reserves of the Chiang Mai Initiative participants are taken net of the aggregate size of the swap agreements and, after 2010, their commitments to the multilateralized CMI.

This in turn contributed to the global imbalances. Given these problems, and problems mentioned in the introduction part, there have been various proposals to reform the current IMS. The goal is to reduce the sources of instability and deal more effectively with residual volatility, without introducing excessive moral hazard. So far, in the G20 level, the agenda for IMS reform included five elements: surveillance of the global economy and financial system and policy collaboration, global financial safety net, management of global capital flows, reserve assets and reserve currencies, and IMF reform. But in theoretical perspective, the reform of the IMS can be approached from the demand-side and supply-side reform.

### Demand-side reform

The key here is how to reduce the widespread strong demand for foreign reserve holdings among EMEs.

**Figure3. Reserves in emerging and developing economies**



Source: IMF International Financial Statistics Last observation: June 2011

Self-insurance against currency crisis is not their sole motivation for holding huge foreign reserves. The export-oriented growth strategy has also been a significant motivation to undervalue the currency and sterilize capital inflows, leading to a large accumulation of foreign reserves. However, according to one estimate, self-insurance – especially after the Asian currency crisis – accounts for one-half to two-thirds of total reserves and has accounted for about half of the increase of total foreign reserves in the decade to 2008 (Obstfeld et al. 2008). One reason could be the fact that the conditions imposed by the IMF have been sometimes deemed to be too onerous (it could not struck a judicious balance between financing and adjustment) for many countries leading to huge reserve accumulation as a form of self-insurance (CIGI report 2012).

In the current global financial market environment where capital flows are volatile, EMEs and developing economies run a high risk of currency crisis. They have to walk a very narrow line of

policy discipline between openness of their financial system and sound economic management. Although the history of their financial market opening is short, many of these economies and developing economies open and integrated into the global system than the advanced economies and developing economies run a high risk of currency crisis. They have to walk a very narrow line of policy discipline between openness of assive sudden reversal of foreign capital flow, with a huge impact on the domestic financial system and the economy. Even though economic management may be sound in these countries, they are exposed to risk through contagion from a crisis that has begun elsewhere. To insure against such a possibility, they have to manage their external balance carefully, maintaining a competitive export environment and a stable macroeconomic situation, including currency stability and competitiveness. This pushes them to intervene in the currency market when there are massive inflows of foreign capital and a buildup of foreign reserves.

There have been several proposals to reduce the self-insurance motivation and thereby demand for foreign reserves. They include third-party insurance and the expansion of the opportunity to borrow from a global and regional reserve pool, or access to global lender of last resort (or something similar). However, the first option would be too costly. The private market to insure against such a risk has so far failed to be established. Public insurance through any international organization would be too costly and unfair in sharing the burden (IMF 2010a and b).

That leads us to the second option o reduce the self-insurance motivation and thereby This can be principally provided by the IMF, but assistance may also flow bilaterally among central banks and via regional financing arrangements in Europe and Asia. The Korean authorities, which hosted the Seoul G20 Summit in November 2010, have taken an initiative with the IMF to push through this option by improving the current financing facilities of the IMF. The IMF has made some innovations in its lending program in consultation with the G20 countries' authorities and these were endorsed at Seoul. These innovations include refining the flexible credit line (FCL) by increasing the size and maturity of the loan with improved pre-qualification criteria (ex ante conditionality) for the loan to reduce the "stigma" effect; and creating new lending facilities, called the precautionary credit line (PCL), for the countries who are not fully qualified for FCL but with generally sound polices, which combines ex ante qualification requirements with focused ex post conditionality (IMF 2011). In Cannes G20 summit meeting in 2011, the leaders endorsed a new IMF precautious and liquidity line (PLL), the details of which still have to be available.

The G20 leaders have endorsed cooperation between the IMF and regional financial arrangements but, so far, a robust framework of cooperation between them on mutually supportive financial and surveillance activities have not been established. The leaders also noted that central banks have a role to play in the provision of global liquidity. But the central banks were successful in preventing a commitment to institutionalizing their agreements at the global level (Truman 2011).



## Supply-side reform

Discussions on supply-side reform of the IMS focus on how to diversify the supply of international reserve currency. The proposals include moving to a multiple currency system; increased allocation and wider use of special drawing rights (SDR); and creating a new global reserve currency. A more diversified allocation across available and new reserve assets would reduce the system's (and individual countries') exposure to risks stemming from economic outturns and policies in a single country, and may provide more stable stores of value by increasing reserve issuers' incentives to pursue sound policies and avoid losing associated benefits. While global reserves are already diversified to some degree and further diversification is likely to continue slowly over time, the pace and eventual degree may not be enough to bring about the desirable balance in supply, especially if reserve accumulation continues apace (IMF 2010 a).

A key question is whether diversification should be encouraged among suitable existing currencies, or if it should be sought more with global reserve assets, acting as a complement or even substitute to existing ones (IMF 2010a). Each proposal has its pros and cons; they also face trade-offs between desirability and political feasibility. As the world becomes more multi-polar in terms of GDP, the drive for a multi-currency system that mimics global economic weights is likely to increase in the long-term. In the meantime, the dollar's role as the dominant reserve currency has been reinforced as the eurozone economies are struggling to keep the single currency alive. A more diversified reserve system would be superior to the current system in that it would help discipline policies of all reserve issuers, given enhanced substitutability of their assets. However, a disadvantage would be lower network externalities and possible costs for trade and investment due to volatility among major reserve currencies (McKinsey Global Institute 2009).

A more ambitious reform option would be to develop a global currency suitable existing currencies, or if it should be sought more with global reserve assets, acting as a complement or even substitute to existing ones (IMF 2010a). Each proposal has conditions of any particular economy. One option is for that global currency – let us keep calling it Bancor – to be adopted by fiat as a common currency (like the euro was), an approach that would immediately result in widespread use and eliminate exchange rate volatility among adopters. A somewhat less ambitious option would be for Bancor to circulate alongside national currencies, though it would need to be adopted by fiat in at least some countries in order for an exchange market to develop. If Bancor were to circulate as a dominant currency in place of the US dollar, then current account imbalances that reflect today's situation – namely surplus countries pegging to Bancor with deficit countries floating against it – would adjust more systematically, and perhaps more automatically than in the current system since the deficit currencies would be expected to depreciate against Bancor (IMF 2010a). However, this option would suffer from the same problems that are faced by common currency areas such as the Eurozone

which has shown deep troubles over the past two years. Adoption of a common currency could limit scope for adjustment to shocks by individual countries. It would be essential to construct governance arrangements that ensure accountability of the Bancor-issuing institution while ensuring its independence. It also requires a substantial concession of economic sovereignty by individual countries. Hence political feasibility is very low, if not zero at this point.

As another option, a greater role could be considered for SDR (UN 2009, Julius 2010, IMF 2010a and b, Zhou 2009, Chin and Yong 2010). The SDR had been almost forgotten until the recent global crisis. The SDR is an international reserve asset created by the IMF in 1969 to supplement official reserves of member countries. For countries with a balance-of-payments need, it represents an unconditional right to obtain foreign exchange or other key reserve assets from other IMF members. The value of the SDR is based on a basket of currencies (currently the US dollar, euro, yen, and pound).<sup>11</sup> But it is not itself is a currency.

It might be useful to re-explore the potential role of the SDR in the new context of today (IMF 2010a and b, Zhou 2009, Chin and Yong 2010). The SDR had been almost forgotten until major currencies, it has rather stable store-of-value and unit-of-account attributes. As in the case of Bancor, if some surplus countries that currently peg to a national currency (e.g. US dollar) were to peg instead to the SDR, some automaticity would be introduced in the global adjustment process as the currencies of deficit countries could depreciate relative to others in the basket. However, one disadvantage is that its use so far has been essentially restricted to the official sector and only about SDR 320 billion (about 6% of total global reserves) has been allocated to member countries (IMF 2010a). Additional hurdles to developing an SDR-based system include potential resistance from reserve issuers who have no direct use for SDRs; restrictive allocation rules and complicated usage rules; the lack of deep and liquid markets; and the need to convert SDRs into a freely usable currency for most payment transactions. Also the composition of the SDR basket should always reflect the relative importance of economies in international trade and financial transactions.

In 2009, Mr Zhou Xiaochuan, governor of the People's Bank of China, explored the potential role of the SDR in the new context of today (IMF 2010a and b, Zhou 2009, Chin and Yong 2010). The SDR had been almost forgotten until major currencies, it had, countries with large amounts of US-dollar foreign reserve assets are concerned about losing value. If, for instance, the PRC moves to rebalance its foreign reserve composition from the dollar to other currencies, it risks causing an immediate fall in the dollar, with no beneficial consequences for the PRC, the US, or the global economy. If the PRC could hold more SDR instead, its foreign reserves would be immediately better diversified into that currency basket, becoming more stable in value. At the Cannes Summit the G20 leaders agreed that the SDR basket composition should continue to reflect the role of currencies in the global financial system. However, this would be

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<sup>11</sup> In the future, the PRC yuan and the Brazilian Real, for instance, could be included.

possible when there is an international agreement to increase the allocation and use of the SDR more extensively, extending its use from the official to private sector.

However, the prospect for the wider use of SDR is not high. As a composite of currencies, SDR must be underwritten by the central banks that issue these currencies. As central banks will not want to increase large amount of money on which it has no control, the appeal of SDRs---that they are not controlled by any national central bank---could also be their weakness (Park and Wyplosz 2012). That means, although the IMS will gradually evolve into multicurrency system reflecting the multipolarization of the global economic weight, the dollar dominance is likely to continue at least for a while. According to Park and Wyplosz (2012), “The dollar is the worst international currency, except for all others.”

### **Historical Experience and Prospects**

As discussed above, although there have been widely shared views on the problems of the current IMS, there are different views on how to proceed toward the reform of the IMS, or whether we ever need reform from the current IMS. Some economists argue that we need fundamental reform while others believe that we cannot find any better alternative to the current system in the near future. The latter group also argue that what we need is reform of the regulatory aspects of the global financial – not monetary – system. They argue that the current system is the outcome of an evolution that complemented the weakness of the previous systems including the gold standard, Bretton Woods, and the interwar free-floating system, and has worked reasonably well over the last 40 years (Truman 2010).

The evolution of the IMS has been shaped not only by the experiences of the previous systems but also by the dominant economic thoughts, balance of economic weights, and political economy of the time. The dominant reserve currency changed with the shift of economic power, but only after a substantial time lag. In the initial stage of these changes, the dominant country was always reluctant to accept changes and push reforms, while the emerging power was hesitant to accept greater responsibility as a reserve issuer. As a result, there was no drastic change, but only gradual and incremental change.

As with the dollar today, the demise of the pound was widely anticipated but the process was more gradual than expected and a widely predicted abrupt collapse was avoided. Even though the emergence of the US as the dominant economic power became evident after the First World War, the pound played the role of major international reserve currency for a while. The IMF estimated that official pound reserves, excluding those held by colonies, were four times the value of official dollar reserves and that in 1947 pound still accounted for about 87% of global foreign exchange reserves (Schenk 2010). It took 10 years from the end of the Second World War (and a 30% devaluation of the

pound) before the share of dollar reserves exceeded that of pound. The shift from pound to the dollar and the elimination of pound as a major international currency resulted in periodic crises, international tensions, and conflict over the United Kingdom and was widely anticipated but the process was more gradual than expected and a widely predicted abrupt collapse was avoided. Even though the emergence of the US as a superpower was a point for pound that would have undermined confidence in the IMS as a whole (Schenk 2010).

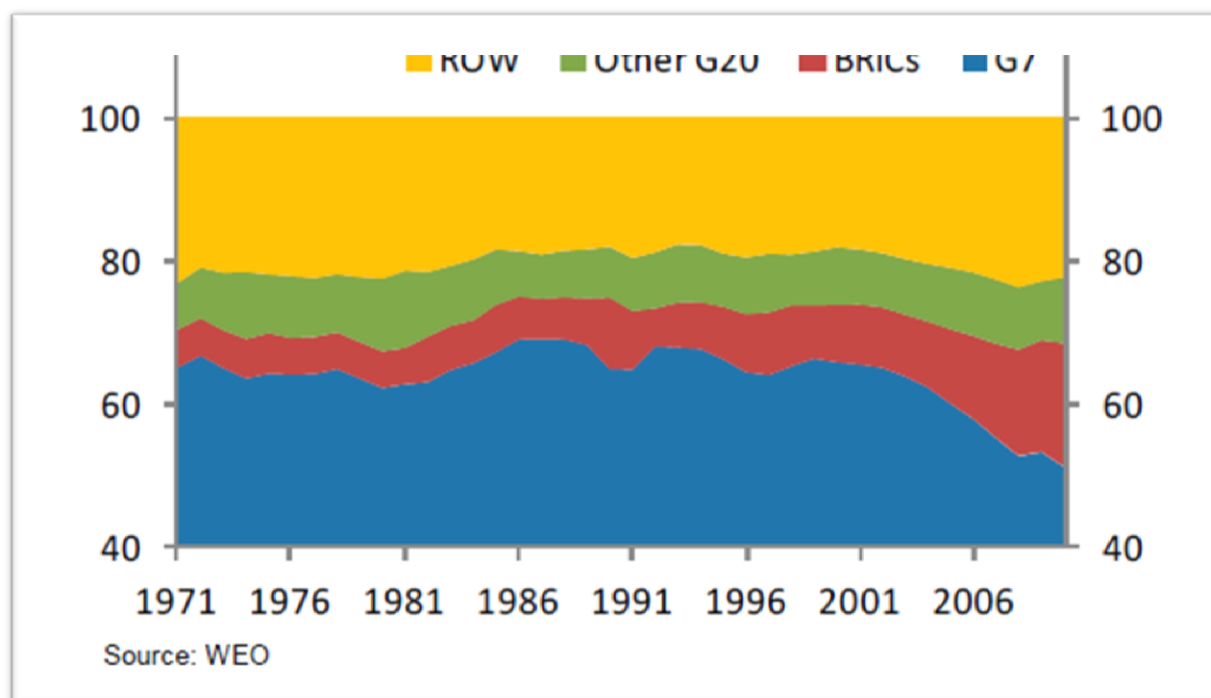
The transition this century would likewise require close collaboration among the major players. The process was more gradual than expected and a widely predicted abrupt collapse was avoided. Even though the emergence of the US as the dominant power of the IMS in the 21st century will be significantly influenced by the views, interests, and requirements of the emerging powers. It is unlikely that any drastic change would be made in the IMS in the near future. The US, whose currency is a dominant international currency and who has a veto power in the IMF, does not want it. No single country is able to take lead in the discussion of IMS reform except the US. As far as the US does not want it, and unless the eurozone fully recovers from the current deep trouble, the discussion and progress of IMS reform would be stalled.

However it is important to ensure the sustainability of the current system and avoid its collapse. This should include efforts at least to strengthen policy coordination and collaboration among the major economies, and to reform the IMF to make it a more effective institution for bilateral and multilateral surveillance and as an international lender of last resort. The success on both fronts depends heavily on global economic governance reform and the role of the G20.

### 3. The G20 and International Monetary System Reform

Any governance body is subject to a test of legitimacy, representativeness, and effectiveness. This should include efforts at least to strengthen policy coordination and collaboration governance forum. It is not formed on the basis of any international treaty or agreement. It is now clear that the problems of global imbalances, economic recession and recovery, and financial system reform cannot be discussed without involving EMEs. G7 can no longer be the right forum. The G20, represents about 80% of the world's GDP, trade, and 67% of its population. (Heinbecker 2010)

**Figure 4. Nominal GDP\_ percent of world GDP at market exchange rates**



Countries from all continents are included in the G20. Therefore, legitimacy and representativeness may not be an important hurdle for the G20 to function as a global governance forum. There is no clear reason why those 20 particular leaders should sit around the same table, but any other selection would invite similar questions and criticism. The G20 seems to be a reasonable grouping as it is balanced between advanced and emerging economies, and in terms of regional representativeness. Effectiveness, however, could be a serious challenge.

As the world may be unable to find an alternative to the G20, the G20 may well stay as the premier forum for global economic governance. The G20 to function as a global governance forum. There is now its usefulness as a forum for policy cooperation during the crisis, it is unclear whether it can continue to be an effective global economic governance body. The experience of G7 suggests that G20 could become no more than an annual diplomatic occasion of leaders meeting without any significant outcome to address or resolve global economic issues. A meeting with 20 leaders will find

it harder to be effective than the one with seven or eight leaders.

As discussed, however, the global economy desperately needs an effective forum to broaden the dialogue and coordinate on key economic and financial policy issues among systemically significant economies. It has been fortunate that the G20 emerged in this circumstance. The emergence of the G20 as the premier forum for international economic cooperation could be the most profound evolution in global economic governance over the last couple of decades. It represents the first adaptation of the global governance structure to reflect dramatic changes in the distribution of power since the end of the Cold War. It is also the only forum in which major established and emerging players meet in a setting of formal equality, unlike the two-tiered Security Council of the UN or the weighted voting in the IFIs.

The G20 acknowledges that global governance cannot be done by the West alone. It can provide a framework in which established and emerging powers can work out together an agreement and negotiate breakthroughs on pressing global economic issues. As Patrick (2010) says “G20 has the potential to shake up the geopolitical order, introducing greater flexibility into global diplomacy and transcending the stultifying bloc politics that have too often hamstrung cooperation on global governance in formal, treaty-based institutions, including the United Nations. Global policy collaboration is a key factor under the current IMS which is not a rule-based one. The US proposed a mutual assessment of economic policies on the basis of so-called, t a rule-based one. The US in which estaanced GrowthGrowthl governance cannot be done by the West alone. It can provide a framework in which established and emerging powers can work out together anpeer reviews of the Organisation for Economic Co-operation and Development and the IMF. However, ‘this is the first time the US has agreed, even proposed, to submit itself to a structured, full peer review process” (Lombardi 2010) in a forum such as the G20 where, at least formally, the peers participate on an equal footing, globally.

The MAP involves extensive information sharing on respective policy plans, along with analysis by the IMF of the combined effect on global economy of these policies, and suggestions of global policy mix that would improve the growth outcome. Broad indicators have been agreed to help gauge the consistency of each countries policies with strong, sustainable, and balanced global growth. Yet, the assessment guidelines have to be defined. The IMF’s involvement has been sought in providing analysis on various national and regional policy frameworks and how they fit together. On the basis of country submissions, the IMF has been asked to point out inconsistencies and/or incoherence in national assumptions, to evaluate the mutual compatibility of different country frameworks and policies, and to determine the aggregate effects of various national frameworks and policies in the global economy. This set of practice represents the first instance of multilateral surveillance on a global scale in recent history. Previously, such surveillance was at best handled within the closed circle of G7. In contrast to the G7 membership, the G20 includes all the systemically

important countries such as large emerging economies of China, India, and Brazil.

There are three types of institutions in the global governance system: international organizations, government networks, and non-state actors (Mo 2010). The last includes transnational civil society groups and business associations. International organizations and government networks are both inter-government organizations (IGOs). The main difference is the degree of formality. An international organization is the more structured of the two; that is, it has a constitutive inter-government agreement and a secretariat. In contrast, government networks are often created without a formal inter-government agreement and managed without a secretariat. According to this classification, the G20 is a government network in that it has neither a charter nor a secretariat. However, the G7 and G20 are government networks whose jurisdictions overlap with those of existing international organizations that affect their decision; they are supervisory government networks. Since supervisory government networks make decisions that existing international organizations are expected to implement, they should be viewed as a sort of legislative body with international organizations playing the role of an executive agency. The fact that the G7 and the G20 exist and have become more influential over time suggests that there is a demand in the global governance system for an effective supervisory and legislative body that is independent of international organizations (Mo 2010).

G7 began as a kind of caucus, an informal group of legislators, with leaders reluctant to involve ministers and refusing to create a permanent secretariat. The global governance system demands a new organization that can work as a legislature and the G20, at this moment, is the alternative available. Some observers say that the G20 is already acting as a sort of legislature as it directs new rules for the global financial systems and assigns tasks to the IFIs.<sup>12</sup>

The role of the IFIs has been limited to their own jurisdiction and, to a large extent, they have not been able to be effective even in their given jurisdictions. They have been marginalized in the global economic governance and have failed to address cross-jurisdictional issues such as financial stability (Varma 2002, Stewart 1996, Bryant 2010). Of course, there are difficulties for the G20 to meet this role. The G20 is a group of 'systemically important' economies. Unfortunately, except for their economic impact, G20 members have little in common with respect to their ideologies and levels of development. It is true, so far, that not only has there been a failure to act in the collective interest, but given the political rancor around the critical policy issues, many G20 countries have taken unilateral actions centered on domestic interests (CIGI 2011). This strengthens the need for the G20 to become more institutionalized in its process of making agreements, decisions, and overall

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<sup>12</sup> Mo (2010) says for example, "In thinking about the meaning and significance of the G20 in the history of global governance, it is constructive to take a step back from current issues and ask ourselves what the founding fathers of the new global governance system would make of the G20. Seen from this constitutional perspective, it is clear that the G20 belongs to the legislative branch side of the global governance system. The G20 is already acting like a legislature as it legislate new rules for the world economy and tasks and evaluates international financial institutions."

implementation.

The G20 should provide the mandate and oversight of the operation for international economic organizations. It also should be able to be a place where effective policy coordination among member countries could happen. But in order for the G20 to meet this challenging task, there should be innovative institutional design for the G20. One element of criticism for the G7 summits was the lack of continuity and implementation monitoring. The G20 will have to demonstrate that it can do better. However, with the increased number of participants relative to the G7/G8 and the likely more comprehensive agenda of the G20, the preparation and follow-up process for the G20 summit will be more complex and demanding as it involves many more players and less continuity in the leadership. Furthermore, unlike the G7, which is a like-mindedness group, the G20 is extremely diverse in terms of political organization and ideology. Divergences among the G20 were masked during the first year of the crisis, as countries focused on the short-term, urgent goals of preventing global economic depression. As the world started to come out of the crisis, the underlying diversity of opinions, interests, and perspectives in the G20 reemerged. Diversity in the composition of the membership has the risk of hindering consensus building within the G20 as was evidenced in the Seoul, Cannes, and Mexico summits, and, therefore, hurting the G20's effectiveness as a global decision-making body.

### **The G20 Secretariat**

Multilateral policy coordination is what lies at the heart of the G20's innovative institutional design for the G20. One element of criticism for the G7 summits was the lack of continuity and in order to set up a G20 secretariat or something similar (Linn 2010, Carin 2010). The G20 chair is part of a revolving three-member management troika of "sherpas," consisting of the current chair, as well as the immediately preceding and succeeding chairs. The chair country now sets up a temporary secretariat for the duration of its term. The temporary secretariat coordinates the group work with technical support from the IFIs. But the G20 reliance on temporary and rotating arrangements is unlikely to last long as they already create the problem of work discontinuity and conflicts of interests. A rotating secretariat makes it hard for the G20 to maintain organizational coherence. The IMF can play a type of secretariat role for the G20; however, the agenda for the G20 has broadened beyond macro-financial issues, such as development, energy and trade. Also, it may not be a good idea for the G20 to depend too much on the IMF for secretariat functions as this may compromise its ability to reform and monitor the IMF.

However, concerns have been expressed that leaders would not want to see a bureaucratic structure take over the G20 summit, or that the existence of a heavy secretarial structure could undermine the commitment by the national executive agencies to their engagement in the G20 summit



processes. The aim is to manage and organize the summit to ensure continuity, institutional memory, and the implementation of plans and promises that are yet to be driven by member governments. The challenge will therefore be to keep any secretariat structure small, non-bureaucratic, and driven by capitals.

Alternative options could be considered to ensure effective logistical and technical support for the G20, such as cross-posting of high-level staff from countries that have had the G20 presidency in the past to countries taking on this role. However, making it as a convention has not been successful so far.

#### **4. Strengthening the Role of the IMF**

The IMF, as a key institution in the IMS, has not played an effective role in the surveillance of the global economy and financial market. The recent upgrading of the IMF by the G20 as the main institution for the surveillance of the global financial market and economy, and the continuing interests of some G20 countries to include the reform of the IMS in G20 agenda suggest that the IMF should be substantially reformed to meet the challenges of this upgraded role. The areas to reform which are discussed here are: resources, lending facilities, surveillance, and governance/management. Some of them have already been endorsed by the G20 and agreed to by member countries, but in some areas, more innovative ideas must be sought.

#### **Resources**

The resources available to the IMF are far smaller than current global capital flows, and are a small fraction of total foreign reserves held by EMEs. The G20 summit meeting in London endorsed the move to increase IMF resources, including quota and borrowing capacity. The expansion and modification of the New Arrangement for Borrowing (NAB) by roughly \$500 billion approximately tripled the total resources available for lending. Agreement on a doubling of the IMF quota further strengthened its resource. After tripling of the resources, the IMF committed over \$200 billion in lending during the recent crisis. (BOK conference, 2011) This will help the IMF to be more effective in meeting the financing gap to member countries when they face foreign currency liquidity problems. Still, its total available resources may not be enough to strengthen the global financial safety net. They will still be about one thirds of the foreign reserves of China alone. Thus, a further increase in resources will be required to support the new lending facilities. At the April meeting in 2012, G-20 Finance Ministers and Central Bank Governors announced, together with the IMFC, that there were “firm commitments to increase IMF resources by over \$430 billion, in addition to the quota increase under the 2010 Quota and Governance Reform. It will be important to clarify contributions towards this increase to complete the process of strengthening the IMF’s resource base.

## Lending Facilities

The IMF is not the only institution with a mandate to provide a global financial safety net. Fund co-financing of rescue packages with regional financial institutions (RFIs) and bilateral creditors has become an important element of IMF lending policies. Central banks of reserve currency net. Fund co-financing of rescue packages with regional financial institutions (RFIs) and bilateral creditors has to increase IMF resof Korea, the swap arrangement between the Federal Reserve and the Bank of Korea in 2009 was perhaps the most effective way to calm foreign exchange market instability. Park (2011) argues that the FRB-Bank of Korea swap arrangement, although of limited size (US\$ 30 billion), stopped the run on Korean won because it was provided by de facto global lender of last resort. Furthermore, careful consideration will need to be practiced in balancing the goal of a more effective global financial safety net against potential moral hazard and the need for adequate safeguards.

The IMF has recently introduced some innovations to its lending facilities, including the modification of the existing lending program as well as the introduction of new lending facilities (FCL, PCL and PLL, as discussed below). The IMF also discussed with G20 governments on how it might, in well-defined circumstances, use a multicountry swap line mechanism to offer liquidity unilaterally to a limited set of systemically important countries with strong policy records. This has not been materialized.

The IMF introduced the FCL in 2009, in response to the criticism that its lending facilities to address unexpected foreign liquidity crises faced by EMEs are too rigid and have costly policy conditionality. However, only three countries – Poland, Mexico, and Colombia – used FCL, as they were facing severe liquidity problems in the global financial crisis. Other EMEs, including Korea, refused to use the FCL though they also faced severe liquidity problems, being afraid of the stigma effect. Specifically, the FCL is for countries with “... very strong fundamentals, policies, and track records of policy implementation’ (IMF 2011d, p. 2). The FCL can be used either in a precautionary way or can be drawn in response to a crisis. Access is determined on a case-by-case basis but there is no pre-set cap. What most distinguishes the FCL from the traditional stand-by (SBA) is that the FCL is not subject to any ex post policy conditionality and the whole amount can be drawn as a single upfront disbursement.

The crisis highlighted three potential gaps in the global financial safety net. First, many countries and observers feel that the FCL is not as predictable and effective an instrument as it was initially planned to be. Second, there is a sense that the FCL caters to only a narrow group of countries and it offers too little to those well-performing countries that are ineligible for FCL. Third, the IMF does not have adequate instruments to act proactively and contain risks in a systemic crisis where several major EMEs, with varying degrees of concern about the stigma effect, may benefit from an early and clear signal by having access to financial resources to calm the market fears that stoke

contagion.

The PCL is the younger sister to the FCL, and eligibility is restricted to countries with y countries and observers feel that the FCL is not as predictable and effective an instrument as it was initially planned to be. Second, there is a sense that the severe policy vulnerability. Unlike the FCL, the PCL does carry some ex post policy conditionality -- in the form of semi-annual monitoring of the key policy vulnerabilities.

In Cannes Summit Meeting (2011), G20 leaders endorsed a new IMF lending facility, Precautionary and Liquidity Line (PLL). *The Precautionary and Liquidity Line (PLL)rs endorsed a new IMPrecautionary Credit Line (PCL)ry and Liquidity Line (PLL). .ities. means that PCL countries donty Line (PLL)rs endorsed a new IMPrecautionary Credit Line (PCL)ry and Lities that preclude them from using the FCL (IMF 2012).*

Moral hazards and resource constraints could be obstacles to the expansion of the global safety net through the reform of the IMFquidity needs of member countries with sound economic fundamentals but with some remaining vulnerabilities that preclude them f threatens the stability of the IMS, these reforms are badly needed. The new facilities would be useful additions to the IMF lending armory and would enhance its capacity to act as international lender of last resort.

Bilateral swap arrangements between central banks are only on an ad hoc and temporary basis, while they could be a very effective tool to stabilize the foreign exchange market in time of global financial crisis. Multilateralization and institutionalization of the swap arrangements through the IMF (or through other means) could be an effective way of building a global financial safety net, providing a global public good in the current global financial market environment where national economies are closely integrated, and there is little distinction between the national financial system and the global one. To some extent, it may be the responsibility of the central banks that issue international reserve currency (especially the Federal Reserve) to provide the global financial system with some role of "lender of last resort" themselves. If this is difficult to institutionalize due to these banks' national laws, it may be done indirectly through the IMF. These central banks could commit some resources under certain conditions to the IMF, with the IMF in turn providing a modality to use these resources for EMEs according to certain prespecified rules and conditions.

## **Surveillance**

Increased access to and expansion of the IMFbanks are only on an ad hoc and temporary basis, while they could be a very eective surveillance of member country economies by the IMF. The IMF failed to establish itself as a credible monitor of the IMS or as a provider of credible surveillance over macroeconomic and financial sector policies of individual economies. Most severe criticism centered on the asymmetry of its surveillance – too harsh on small developing countries with a deficit while

almost mute on advanced economies and surplus countries.

The IMF surveillance should be strengthened in both the bilateral and multilateral arenas. The IMF should be able to clearly point out the problems in member countries, including advanced economies, which they can take seriously so as to make the necessary policy adjustments. For that, IMF leverage should be strengthened. This can be done only in a multilateral context such as the G20. The G20 should strengthen its function of mutual assessment of macroeconomic policies. Global economic surveillance should, indeed, be one of the G20's important roles. If the G20 mandates some significant role for the IMF in this process, strengthened peer pressure could give the IMF's bilateral surveillance more bite. Its multilateral surveillance, too, needs to be strengthened, both on macroeconomic policies and financial market issues.

The surveillance role of the IMF should be reinforced to more effectively address problems of exchange rates and payment disequilibria. It has been argued that surveillance in its current form is weakened by the absence of an objective or widely agreed criteria by which to judge whether a policy stance is determined to domestic and global stability. This thought is behind the G20's effort to adopt guidelines to assess its members' policies. It has been suggested for example by Truman (2010) and Dorucci and McKay(2011) that a similar approach be adopted in the context of the IMF surveillance, as reducing discretion would make it harder for the Fund to avoid tough or critical assessments in the face of political resistance, both from the country concerned and occasionally the rest of the membership acting as peer reviewers. Experience with an indicator-based approach in the context of exchange rate surveillance since 2007 suggests, however, that there are considerable difficulties in making such an approach work in practice in the absence of broad acceptance by the IMF membership (IMF 2011).

In order to produce objective and neutral reports on the economic policies of individual countries, it would be necessary to insulate IMF staff from political pressures from their own board. The IMF needs to issue its own reports on exchange rate policies of major member countries, assessing a wider range of policies including the monetary, fiscal, exchange rate policies and financial sectors more frequently and independently. It should perhaps be the IMF management rather than the board that has the authority to approve such surveillance reports, to help keep staff from political pressure.

The G20 countries have so far committed to a peer-review process for their economic policies and to a broadly defined policy objective through MAP. However, so far, they have failed to establish specifically defined policy targets for which they can be held accountable in a multilateral forum. This is reminiscent of early IMF attempts, in the 1970s, to get systemically important countries to commit to a multilateral surveillance framework (Lombardi 2010). Ultimately, these countries distanced themselves from specific commitments and the IMF multilateral surveillance became simply a forum for exchanging views and information on each other's economic policies. With the G7, the IMF

played an advisory role; but with the G20, its advisory role is more clearly spelled out, and, given the greater number of economies, needs to be much more strategic. Nevertheless, its role of surveillance is not clearly mandated yet.

The G20 itself should implement an effective mutual assessment on the macroeconomic and financial policies of member countries in the context of well-defined objectives set for the whole group. The IMF should be asked to provide the framework and technical support of this assessment, which should be based on some rigorous quantitative analysis.<sup>13</sup> It may be asked to strengthen the effective mutual assessment on the macroeconomic and financial policies of member countries in the context of well-defined objectives set for the whole group. The IMF should become more vigorously engaged in the mutual assessment process. This would help to increase its leverage in its bilateral surveillance of its major member countries.

The success of mutual assessment or peer-review surveillance depends critically on several essential ingredients: competent staff to support the process, the strong analytical foundation for studying macroeconomic interactions, and political independence. For the first two, it would, in fact, be difficult to find a better alternative to the IMF for this role. What, then, should the IMF do to fulfill this task? In essence, it should perform sharply defined multilateral surveillance, generate greater value and traction from bilateral surveillance, and integrate the two better. For that, it should do more analysis of outward spillovers, and generate new reports covering such spillovers from countries whose policies or circumstances affect the overall system.

Recently, the IMF has launched, experimentally, surveillance depends critically on several essential ingredients: competent staff to support the process, the strong analytical foundation of concerns of policy makers on impacts from other countries' policies, and bring to bear staff's analysis on the size and implications of such spillovers (IMF 2011). These reports should be given wide attention by global community and be used to provide more peer pressure to systemic countries.

In order to increase the effectiveness of bilateral surveillance, especially with advanced economies and surplus countries, the IMF should try to reach broader audiences than it does now by producing more timely and topical reports, and increase engagement with stakeholders. By increasing the peer pressure of the global community through its timely and credible reports, it can improve the effectiveness of its bilateral as well as multilateral surveillance. Setting up an independent outside panel of experts, in addition to the Fund's internal Independent Evaluation Office (IEO), which can regularly evaluate and monitor the IMF's performance in such surveillance, could also be a helpful measure.

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<sup>13</sup> At the Seoul Summit Meeting, the leaders agreed to enhance the Mutual Assessment Process (MAP) to promote external sustainability. Persistently large imbalances, assessed against indicative guidelines to be agreed by Finance Ministers and Central Bank Governors, would warrant an assessment of their nature and the root causes of impediments to adjustment as part of the MAP.

## Governance/Management

Enhanced surveillance by the IMF would mean increased IMF interventions in member countries economies and surplus countries, the IMF should try to reach broader audiences than it does now by producing more timely and topical reports, and increase engagement. Hence the most important element of IMF reform is change to its governance structure.

There has been widely shared criticism that in the past the IMF has been used as an instrument for industrial nations to achieve their policy objectives. It bailed out creditors of industrial countries and imposed very costly adjustment programs on debtor countries. Mistrust in the IMF is in part due to the perception that its surveillance has been asymmetric, with greatest attention paid to the weaker developing states or those in deficit, while the major deficit and surplus countries, including the US and China, are given too much leeway. Mistrust is also in part due to its policy conditionality based too much (or sometimes axiomatic) on “belief in the market.” This is not to say that the IMF has made no attempt to overcome this criticism. In recent years, it has in fact become more flexible in its approach to the individual country situations and has somewhat shifted its position from emphasizing quick adjustment to expanded financing as a possible alternative to rapid adjustments (Adam, Collier, and Vines 2010). Nevertheless, further efforts are needed in order to establish trust among all its member countries, and this can be done most effectively through rebalancing of the governance/management structure of the institution.

There are two major problems with present governance arrangements: the composition and voting structure of the board, and the appointment of management and those at senior positions. The board is too heavily weighted toward industrial countries, especially in Europe, and it fails to give sufficient weight to EMEs and developing countries, which are of course seriously affected by its decisions. Currently, the quota share of advanced economies is more than 60% (US 17.6%, Europe 31%). EMEs and developing countries’ share is about 39%. Europe’s voice can be potentially much bigger than this figure suggests, due to the current composition of the executive board.

At the G20 Seoul Summit it was agreed that 6% of the quota share would be transferred from European to emerging market economies, though the formula to achieve this has not been fully sorted out. It was also agreed that two seats of the executive board currently occupied by Europe would be transferred to EMEs. However, these two measures would not change the governance structure significantly – the US and Western Europe would still dominate decision making through various rules (including the “85% rule” and the veto power of the US) and through the composition of the executive board. Although the quota of EMEs would be increased, the Board and decision making of the IMF still would be dominated by advanced economies, i.e., the US and Europe.

The governance structure should be more radically changed, for without it, the IMF risks becoming marginalized as an agent solely for a group of industrial countries. There is a large

asymmetry between the governance structures of G20 and the IMF. Ideally, the formula for IMF quota reallocation should give emerging economic powers more representation than their current economic weight (which is based on nominal GDP) justifies. However, as this would be difficult to implement in reality, other measures would have to be sought. One way would be a reconfiguration of the composition of the board of directors, cutting the number of European seats the IMF risks becoming marginalized as an agent. Another way would be to have the G20 finance ministers meeting as a steering committee for IMF governance, determining the direction of major policy issues. If the G20 became a decision-making ministerial body within the IMF itself, it would reduce the asymmetry both between global economic governance forums and the governance structure of the IMF. This would also help reassert the centrality of the IMF's role as a key institution in IMS. This proposal has been featured in a recent advisory report to the IMF Managing Director (the "Fourth Pillar" report) and has been put forward by a number of people, including Mervyn King, governor of the Bank of England (Lombardi 2010, King 2010).<sup>14</sup> The progress of reform of the IMS, including increased allocation and wider use of SDR as international reserve assets, could be facilitated when this kind of significant change in the IMF governance structure occurs.

On the second problem, that of appointments, the selection process for managing director should become more transparent and be open to qualified non-Europeans, including those from EMEs. Appointments to senior positions should be more merit-based, and better balanced between staff from advanced economies and EMEs.

## 5. Concluding remarks

This paper has discussed the reform agenda of the IMS and how to make the G20 an effective global economic governance forum. It also discussed how to enhance the role of the IMF in surveillance, both bilateral and multilateral, and provision of systemic liquidity, along with discussions about its governance reform.

Intensified interest in the problems and reform of the IMS has been manifest since the 2008 global financial crisis. However, there has been little consensus among academics and policy makers on desirable path for reform, or even whether the reform is necessary or not. As a consequence, there has not been much concrete accomplishment so far. The discussion and the reform efforts through the G20 process has been concentrated on strengthening policy collaboration; global financial safety net; monitoring and management of capital flows; surveillance of global economy and financial system; and reserve assets and reserve currencies.

Regarding policy collaboration, the establishment of MAP is a progress. But the G20 so far has failed to establish the specifics of the modality of the MAP. The G20 has not delivered, as part of

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<sup>14</sup> Mervyn King, speech at the University of Exeter, 19 January 2010.

its Framework for Strong, Sustainable, and Balanced Growth, and the associated MAP, a set of specific, quantified, and verifiable policy commitments through transparent process yet. No clear obligations and responsibilities have been agreed, except leaving them to peer pressure of member countries.

Regarding global financial safety net, some progress has been made by establishing new lending facilities of the IMF (FCL, PCL, PLL) and increasing the IMF resources. However, little progress has been made in linking the IMF and regional financial arrangements such as CMIA, EFSF and ESM. Institutionalization of swap arrangements among central banks, which would possibly be the most effective global financial safety net, has been failed. This is an area which deserves further G20 efforts.

On capital flows (although this has not been discussed in this paper), renewed attention has been made on inflows as well as outflows and on the policies of source countries as well as destination countries. While these efforts have not produced full agreement, they have contributed to greater consensus that has emerged over the last four years and produced a set of “coherent conclusions for management of capital flows drawing on country experiences.” The conclusions are not binding on countries and do not limit national policy choices. But it became clear that EMEs can now adopt temporary measures more freely to control capital flows than before, of course, in the relevant broad policy context when they are deemed to be necessary.

On reserve asset and reserve currencies, the discussions have not produced any tangible outcome, except the allocation of greater amount of SDR. This is not surprising because the dollarestination countries. While these efforts have not prdecisions private sector actors and institutions rather than public decision. And also because, there would be a limit in the effort to promote SDR as a replacement for the dollar as reserve assets and as an international currency (Park and Wyplosz 2011, Truman 2011)

Given the current international political and economic reality, it is hard to expect a major progress in IMS reform would be made in the foreseeable future. The best alternative would be strengthening the role of the IMF in its systemic liquidity provision and surveillance; and strengthening policy collaboration through the G20 process. For this, the effectiveness of the G20 as a global governance forum should be enhanced, and greater involvement of the IMF in the G20’s MAP would be needed.

The role of the IMF has been changing in responding to the crisis, pushing early on for economic stimulus, helping coordinate policies, providing financial resources, supporting the G-20 with analysis, and in IMS reform. Now, the challenge is to go further, including a greater focus on financial sector issues and more generally enhancing the effectiveness of its bilateral and multilateral surveillance. It should earn more trust among EMEs by showing its political independence from the US and major European countries. In order to become more effective in surveillance, not only the



greater involvement in the G20 process but also more credible and independent analysis of its reports would be essential.

The role of the IMF has been changing in responding to the crisis, pushing early on for economic stimulus, helping cooordes for the instability of the global financial system. The development of institutions fell far behind that of financial markets over the last two or three decades. Integrated and tightly interconnected financial markets and global economy now require new institutions including the IMS. However, the prospect on this goal is very dim. We can expect only an evolutionary process toward this goal. It is also true that there is little that collective public policy decisions can do to promote that evolution.

History shows us that the world has suffered when incumbent powers fail to give rising powers their proper place. Inclusion of major EMEs, including China, Brazil, India, and others in the G20, has been the right move. Not only in the G20 but in the IMF, there has been a steady effort to shift voting power and representation (and therefore influence) away from the developed countries to the emerging and developing countries, thereby engendering a broader sense of ownership and trust in the IMF. The challenge now is how to make the G20 and the IMF more effective. Without institutional innovations within the G20, there is a high risk that its summits will follow the path of previous summit meetings, such as G7. Without substantial changes in governance structure and surveillance practices, there is risk that the IMF would continue to be marginalized in addressing global economic and financial issues.

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## Session 1

# International Monetary System Reform



### Presentation 3

## **Charles Wyplosz** (to be presented by Yung Chul Park)

Professor at Graduate Institute in Geneva, Switzerland

Charles Wyplosz is Professor of International Economics at the Graduate Institute in Geneva where he is Director of the International Centre for Money and Banking Studies.

Previously, he has served as Associate Dean for Research and Development at INSEAD and Director of the PhD program in Economics at the Ecole des Hautes Etudes en Science Sociales in Paris. He also has been Director of the International Macroeconomics Program of CEPR, the leading European network of economists.

His main research areas include financial crises, European monetary integration, fiscal policy and regional monetary integration. He is the co-author of two leading textbooks (*Macroeconomics* and *European Economic Integration*) and has published several books. Previously a founding Managing Editor of the review *Economic Policy*, he serves on several boards of professional reviews and European research centers. He is a regular columnist in newspapers (*Financial Time*, *Le Monde*, *Libération*, *Le Temps*, *Finanz und Wirtschaft*, and *Handelsblatt*), he had a weekly spot on *Radio Suisse Romande* and is frequently interviewed by major media. He is a founding contributor of websites VoxEU and Telos.

Currently a member of the Advisory Scientific Committee of the European Systemic Risk Board, of the Panel of Experts of the European Parliament's Economic and Monetary Affairs Committee, and of the "Bellagio Group", Charles Wyplosz is an occasional consultant to the European Commission, the IMF, the World Bank, the United Nations, the Asian Development Bank, and the Inter-American Development Bank. He has been a member of the "Conseil d'Analyse Economique" which reports to the Prime Minister of France, of the French Finance Minister's "Commission des Comptes de la Nation" and has advised the President of France and the governments of the Russian Federation and of Cyprus.

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Recent speaking engagements include interventions at the European Central Bank, the German Bank Association, the Asian Development Bank, and numerous banks around the world.

A French national, Charles Wyplosz holds degrees in Engineering and Statistics from Paris and a PhD in Economics from Harvard University.

## The International Monetary System After the Euro Area Sovereign Debt Crisis

### Introduction

There was a time when the developed countries formed the heart of the international financial system. This is where financial markets were largest, most sophisticated and most stable. The US dollar and the euro vied for being the most important global currency. The IMF was promoting worldwide the global consensus, explaining to emerging market and developing countries that open trade and capital markets, along with freely floating exchange rates, was the way to catch up with the developed countries. The Great Moderation of the 2000s proved this right. Growth picked up around the globe, including Africa long considered as a hopeless case, while inflation remained mostly subdued. Then the Great Financial Crisis started to unfold in 2007, reached an apex in 2008 and was soon followed by the sovereign debt crisis in the Euro Area. These are historical developments that cannot fail but to have a lasting impact of the international monetary system.

The present paper looks into the lessons that could be drawn from the Euro Area crisis. We have rediscovered that international financial markets are, and will remain, inherently unstable. In particular, regions characterized by a high degree of economic and monetary integration find that they need ever-deeper integration.<sup>35</sup> Section 0 kicks off the paper by asking what would have been the implications of a successful euro for the future of the international monetary system. The next section insists that the lessons from the Euro Area crisis must start with a proper diagnosis of what went wrong. The proposed diagnosis is more nuanced than just asserting that the euro was a mistake doomed to failure. Section 0 starts from this diagnosis and outlines a number of possible implications for the Euro Area crisis. The last section brings together the main conclusions.

### Global Implications of the Euro

Before the crisis, the adoption of a common currency in Europe was hailed as a major success. The European experience was even seen as a sort of blueprint of regional economic and monetary integration, even though it has long been understood that this experience cannot be simply transferred (Park and Wyplosz, 2010). The euro success carried four important implications for the international monetary system.

First, one could envision an evolution whereby regions would pursue first trade integration and then move on to financial integration, following McKinnon's sequencing. But they could go further and aim at adopting a common currency. In that view, the global system would at some point include a few "mega currencies" that would freely float against each other. The countries of those regions that do not integrate would either float independently or adopt basket pegs as suggested by Williamson (1999).

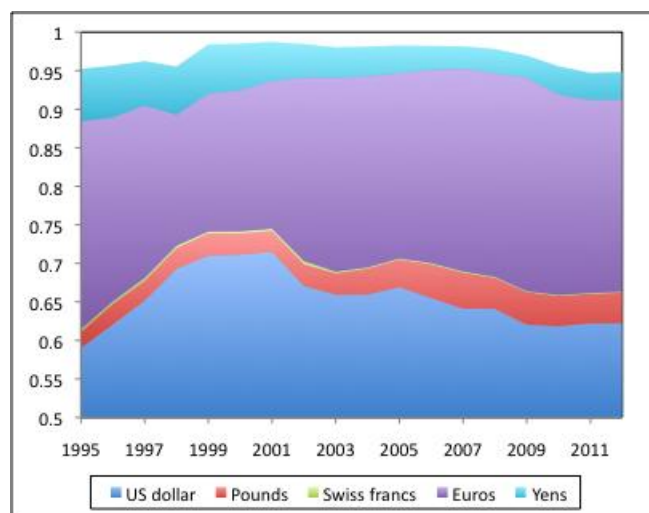
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<sup>35</sup> This theme is developed in Wyplosz (2006).

Second, this would eventually have consequences in the IMF Board. The IMF only recognizes countries but the logic of its mission, a smooth functioning of international payments would eventually lead to a currency-based organization. Not only would this encourage regional monetary integration, but also it would allow for a deep redistribution of quotas and voting rights. Indeed, the current criteria give some weight to country trade shares. Ignoring intra-monetary union trade would be a way of achieving a fairer distribution.

Third, the international role of the dollar would be affected. A plausible evolution would be a limited number of international mega-currencies. shows that, relative to the legacy currencies and ECUs, the europlausible evolution would be a limited number of internationdeclined considerably since the crisis. The economic properties of such a non-hegemonic system are largely unknown and much under-studied. Of course, seigniorage income would be shared but the potential for currency instability could rise.

Finally, large monetary unions could develop their own external stabilization arrangements through loans and emergency assistance. This would lead to implicit regional monetary funds, as initially proposed in East Asia in 1997.



**Figure 1. Shares of world exchange reserves**

Note: The euro world exchange reserves develop their own external stabilization Source: COFER database, IMF.

These various long-term implications of the euro seem to have been washed away by the crisis. The next session argues that it is too early to declare the euro a failure. Instead it identifies some flaws that are of general interest.

### **The European Experience: Two Important Flaws and A Crucial One**



As in many other developed countries, the Great Financial Crisis of 2008 resulted in an explosion of public debts in most Euro Area countries. Probably because the euro is in many ways a foreign currency for member countries (De Grauwe, 2011), this explosion in turn triggered the sovereign debt crisis when the financial markets became convinced that defaults were likely.

The European sovereign debt crisis may lead to dissolution of the euro but that is not the most likely scenario. Much as the world described East Asia as a basket case after the onset of the 1997 crisis, only to discover soon after that it was and remains the world's most dynamic region, the architecture of the Euro Area is basically sound. Yet, complex institutions are almost never built one hundred percent perfectly right from the start. The Maastricht Treaty, which established the euro, suffered from two major flaws – and many minor ones. These two flaws are the direct cause of the crisis. They were detected even before the launch of the euro but policymakers decided to ignore the warnings, a situation that is the rule almost everywhere. In addition, once the crisis erupted, policymakers adopted the wrong response and even violated the treaty, exposing a crucial weakness of the architecture. The present section describes these flaws.

### **Fiscal discipline**

The sovereign debt crisis in the Euro Area has brought home a long-held view: a monetary union among independent states is sustainable only if each and every member state strictly enforces fiscal discipline.<sup>36</sup> Unfortunately, the solution adopted to deal with this problem was flawed, as explained early on in Eichengreen and Wyplosz (1998). In the Maastricht Treaty, fiscal discipline rested on two arrangements: the excessive deficit procedure and the no-bailout rule. The latter is examined in Section 0.

The first discipline requirement took the form of the Stability and Growth Pact. In its initial version, the pact required that the budget deficit remains less than 3% of GDP unless justified by a recession. Enforcement rested on graduated warnings and injunctions from the European Commission, with the threat of a fine. Importantly, however, final decisions rested with the Council, which brings together the Heads of States and Governments. When Germany and France were to be brought into the procedure in 2003, following two years of slow growth, the Council voted to put the pact “in abeyance” under political pressure from the Euro Area's two largest countries. Early warnings that the 3% nominal limit was too arbitrary and inflexible to be strictly enforced were proven true.<sup>37</sup> This led to a first revision of the pact in 2005. The new version strengthened the its initial version, the pact required that the budget deficit remains less than 3% of GDP unless justified by a recession. Enforcement rested on g-growth years not to result in a breach of the 3% limit. The revised pact also specified that the Commission would base its recommendations on cyclically adjusted budget measures.

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<sup>36</sup> The issue was clearly identified in the Delors Report, which set the main parameters of the Maastricht Treaty.

<sup>37</sup> For an early criticism of the pact, see Eichengreen and Wyplosz (1998).

This makes it clear that policymakers have interpreted the repeated failure of the pact as a sign of both poor design and lax enforcement. The 3% deficit rule concerns the actual budget, which is cyclical and therefore not effectively under the authorities control. This is why the emphasis has shifted to the cyclically adjusted budget, a welcome correction. Another design flaw is that the constraint is asymmetric, binding only when the deficit limit is reached, which mostly occur in slow growth or recession years. This has led to the reinforcement of the “preventive arm”, which is superfluous if the rule is applied to the cyclically adjusted budget. Finally, the requirements apply year after year, which fails to recognize that fiscal discipline is a long-term concept. This has led to the additional requirement that member country governments submit medium-term plans, which takes the form of formal but illusory commitments given that they are highly uncertain. The result is a complicated and very formal process with limited economic content. This process further undermines enforcement, which is in fact impossible. Indeed, fiscal policies remain a domain of national sovereignty. It is therefore impossible for the European Commission’s recommendations, which are meant to be compulsory for countries in excessive deficit, to bind national parliaments. This is why the Maastricht treaty envisions sanctions in the form of fines, but fines are politically dangerous and have never been decided, in spite of widespread indiscipline.

In the end, no matter how refined ers have interpreted the rere, there is an inherent contradiction between fiscal policy sovereignty and the enforcement of the excessive deficit procedure. This is an important conclusion: a monetary union requires that each country be fiscally disciplined and therefore implies that some sovereignty be abandoned.

The solution adopted so far is flawed because this contradiction has not been resolved. However, the Fiscal Compact, also called the Treaty on Stability, Coordination and Governance in the Economic And Monetary Union, which is in the ratification process at the time of writing, represents a major step in the direction. This new pact in effect introduces the principle of fiscal policy decentralization, as it requires each country to introduce legislation that mandates that thee cyclically balanced budget be balanced.

### **Banking regulation and supervision**

Another flaw concerns banking regulation and supervision. No matter how well regulated and supervised banks are, bank failures are unlikely to be eliminated forever. When banks fail, the issue of lending in last resort arises naturally. It was logical therefore, as noted by Begg et al. (1998) to ask what could the ECB’s response in case it would have to intervene as lender in last resort. Given the moral hazard inherent in any such intervention, any central bank must know with great precision what is the situation of each bank. It should have been clear that national bank supervision was unlikely to provide the ECB with the required amount of information at the required time.

The problem was made even worse by the fact that, in Europe as in many countries, the national authorities

tend to protect their banks.<sup>38</sup> Because much of the emphasis is on developing and defending a national champion, the presumption is that a European supervision would be less captured. This aspect may explain why suggestions to that effect have always been ignored. This was the case at the onset of the euro, when the issue was considered too delicate to be even discussed. This was the case again after the 2008 crisis, when a number of Euro Area banks failed and, for those that had significant cross-border operations, the multi-country bailouts were complicated. This is the case at the time of writing when, under pressure of the potential lender in last resort, the ECB, policymakers are working on a n a developing and defending a national champion, the presumption is that a European supervision would be less captured. This aspect may explain why suggestions to that effect have always been ely working to defang the project.

The message is clear. Monetary integration has two main effects on the banking sector. It encourages cross-border activities, with the implication that eventual rescues must involve more than one government, each of which is eager to push the costs on to foreign taxpayer. Monetary integration also means that there must be alignment between the lender in last resort, the common central bank, and the regulation/supervision authorities. The recent decision to establish a “banking union” shows that the need to achieve such a realignment of incentives has been finally recognized. It is unlikely, however, that the banking union – an extraordinarily vague term – that will emerge will be the definitive and appropriate answer, as political and private interests are very powerful. At least a step will have been taken.

Once again, we see how integration generates a dynamic of its own, a process that has been at work in all federal states. The European countries started with a tariff union, moved to a common market, which then underpinned the search for internal exchange rate stability. The system of fixed exchange rates then made way to a monetary union, which is now calling for a further erosion of national sovereignty.

### **The no-bailout clause**

The second disciplinary device of the Maastricht Treaty is the no-bailout rule that strictly forbids governments, European institutions and the ECB to dbe liable for or assume the commitments of central governments, regional, local or other public authoritiesme(art. 125). Given the flaws of the Stability and Growth Pact, the no-bailout rule could be seen as the only real disciplinary device in place, yet there always were doubts whether it would be enforced when and if needed.

The May 2010 bailout of Greece by both the other Euro Area countries and the ECB was a clear breach of the rule. It was presented then as special and unique, as if just one rule violation is acceptable. Bailouts of Ireland and Portugal showed that the rule was definitely ignored. The creation of the European Financial Stability Facility (EFSF) in 2010, designed to provide loans to struggling countries, was a further step in

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<sup>38</sup> For a recent restatement, see Calomiris (2011).

institutionalizing the *de facto* elimination of the no-bailout rule, but the Facility was meant to be temporary and expire in 2012. The European Stability Mechanism (ESM) is in fact a permanent continuation of the EFSF and therefore the confirmation that the no-bailout rule is definitely set aside.

The question is whether a no-bailout rule is politically viable. As previously noted, from the start, doubts were expressed that the rule would be applied when and if a member state would be on the verge of default. The practical experience was postwar Germany, where the federal government has bailed two states so far (Heppke-Falk and Wolff, 2007). Another experience is that of the US. After decades of repeated bailouts of states, the Congress decided in the 1840s to never do it any more. With the exception of a few Southern states after the civil war, there has been no bailout again and the general belief is that the issue is now settled. This belief is largely based on the fact that the implicit but effective no-bailout rule has provided incentives for US states to adopt fairly strict balanced budget rules (Henning and Kessler, 2012).

The likely implication is that the Euro Area architecture of the US. After decades of repeated bailouts of states, the Congress decided in the 1840s to never do it any more. With the exception of a few Southern states after the civil war, buttressed by national-level disciplinary arrangements that are enforceable. The general message for regional integration is not that fiscal policy sovereignty must be abandoned with exception of a few Southern states after the civil war, making national institutions must be adjusted adequately (Wyplosz, 2012). This in turn means that some profound changes are needed, possibly against national traditions and vested interests. After all, however, trade integration carries a similar implication: much of the protectionist apparatus must be dismantled.

### **Implications for the International Monetary System**

The general case for economic cooperation has long been made both in theory (Hamada, 1976 and 1985; Cooper, 1968; Mundell, 1961). Cooperative arrangements that help to sort out desired from undesired exchange rate fluctuations are inherently desirable; this is how the euro came into existence, following two decades of exchange rate stabilization within the European Monetary System. The dynamics of economic integration recollect in Section 0 shows that, once started, cooperation that effectively promotes integration must become ever deeper. Deeper integration, however, requires transfers of sovereignty, which are politically difficult. As a consequence, these transfers are often delayed or mismanaged. The flaws that led to the Euro Area crisis indeed involve delays (the acceptance of a single banking regulator and supervisor) and mismanagement (the fiscal discipline problem). The case for cooperation obviously overlooks these dynamic political economic aspects. Does it mean that monetary cooperation, necessary at the regional level, is doomed? This section argues that the answer is largely negative.

### **Regional Cooperation**

This general observation applies to regions where a high level of economic and financial integration has been

achieved or is deemed desirable. There are at least five good reasons for regional cooperation.

First, the new trade theory explains well why trade links tend to be deeper with neighboring countries. Since generally “finance follows trade”, deeper trade links foster a deepening of financial links. This is why exchange rates tend to matter more at the regional than at the global level.

Second, bilateral cooperation on exchange rates is an unavoidable source of externality for third parties and, given the regional bias in economic integration, this source of externality is more sizeable at the regional level. Bilateral cooperation calls for international cooperation. On the other hand, global cooperation, no matter how desirable it can be, is inherently difficult because of the sheer number of parties involved. It follows that regional cooperation is often a good compromise between bilateral and global cooperation.

Third, it is often the case that countries that belong to the same region share similar specialization in trade. It follows that, in the face of external shocks, the desirable paths of their respective exchange rates are reasonably similar.

Fourth, countries from the same region often already have in place various mechanisms or institutions designed to organize consultations. This provides an infrastructure to deal with monetary matters.

Fifth, geographic closeness can lead producers to relocate in other countries of the same region if excessive exchange rate fluctuations prove to hurt their activities. Such relocations are inherently costly and unproductive. Regional efforts at limiting exchange rate fluctuations stand to reduce unproductive relocations.

### **How the Euro Area Crisis is Changing Views**

The question is how the European debt may be changing the case for cooperation. The crisis has revealed that even deep arrangements may have flaws that backfire under specific circumstances. Put differently, it is very unlikely that any cooperation arrangement, no matter how well crafted, may occasionally create more harm than good. Thus the crisis has added five new specific arguments in favor of monetary cooperation.

First, the crisis has shown that in a low-inflation environment – likely to be preserved durably – interests can quickly reach the zero lower bound. At that stage, the only tool left, quantitative easing, strongly affects the exchange rate. This brings to the fore the issue of cooperation, both to avoid the deleterious consequences of perceived beggar-the-neighbor effects and to avoid bruising “currency wars”.

Second, while it is desirable on a day-by-day basis, monetary cooperation is most important in crisis periods. This is why Chiang Mai came after the East Asian crisis, much as Europe started on its path to monetary unification after the collapse of the Bretton Woods system brought tensions into bilateral exchange rates. In the

midst of crisis, there is no time for negotiations and for setting rules. Cooperation therefore must be specified *ex ante* in great detail, including procedures that can be triggered automatically in emergency situations.

Third, the case for automaticity is enhanced by the fact that, at crisis times, political considerations may come to bear on policy decisions. Over the last two years, the tense, and highly politicized, debate between China and the US on the RMB flexibility issue has interfered with the objective of finding adequate solutions for regional bilateral exchange rates.

Fourth, the Europeans have now put in motion a process that is likely to lead to the establishment of a de facto European monetary fund. Already during the Greek crisis in May 2010, the collective intervention of other euro area countries has been closely harmonized with the IMF program. What was deemed impossible in East Asia in 1997 is now becoming reality in Europe. Rightly or wrongly, other regions may find it desirable, and easier, to establish mutual insurance systems outside of the IMF.

Fifth, the Euro Area is likely to undergo slow growth for a sizeable period, not unlike Japan's period of a de facto European monetary fund. Already during the Greek crisis in May 2010, the collective intervention of other euro area countries, therefore, is losing its main export markets, which have traditionally played a strategic growth-enhancing role. Relying more on domestic demand will be needed in the rest of the world. In turn, rebalancing, as this strategy is called in China, will enhance the importance of the region's market for its future growth. This will make it more similar to Europe since the 1960s, including a strong concern toward internal exchange rate stability.

### **Further implications**

Even if the euro survives, most of the significant evolutions mentioned in Section 0 are likely to evaporate. The fact that deep monetary integration inevitably calls for further transfers of sovereignty in different segments of economic and financial policies is bound to discourage the goal of achieving regional currency sharing. This is already visible in East Asia, the only region so far that had been pursuing monetary integration. The same conclusion is likely to dampen projects to adopt a foreign currency, explicitly or implicitly.<sup>39</sup> This may be especially sensitive in East Asia given that integration inevitably calls for further transfers of sovereignty in different segments. This means that reform at the IMF will not move in the direction of recognizing currencies and therefore that any change in voting rights will have to come the hard way, through zero-sum game redistribution. On the other hand, the precedent of regional mutual support arrangement, which works alongside with the IMF, opens up new possibilities. In Euro Area programs, the IMF is the junior partner, contributing one third of the funds and consequently not leading the negotiations on conditionality.<sup>40</sup> Many countries have now accumulated large

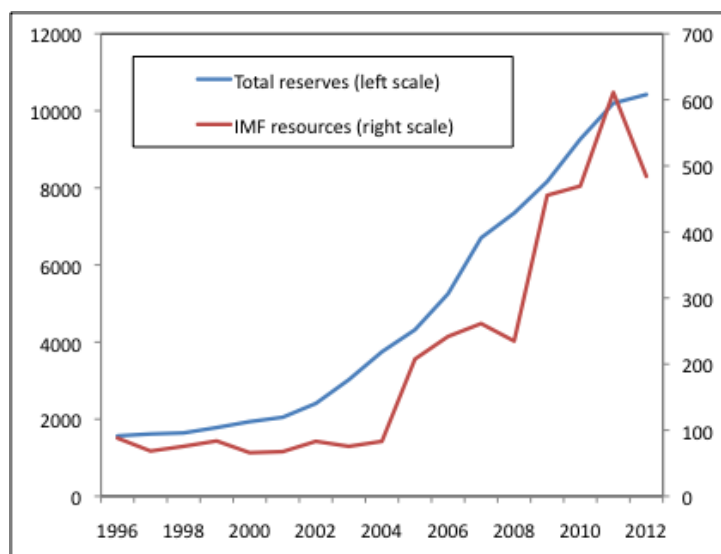
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<sup>39</sup> Already the 2001 Argentinean crisis showed the difficulties of operating a currency board arrangement without fiscal discipline firmly in place. The crisis also illustrated the risks of (partial) dollarization, see Blejer and **Levy Yeyati (2010)**.

<sup>40</sup> In addition, the Euro Area countries need euros, not foreign currencies. As noted earlier, the euro can be seen as a foreign currency for

foreign exchange reserves. They can envision pooling them and setting up arrangements to be leading partners in future assistance programs. As shows, global reserves are about ten times larger than the total resources of the IMF and the latter struggle to keep up with the former. This suggests that regional reserve pools are likely to dwarf available IMF resources.

**Figure 2. Global foreign exchange reserves and IMF resources**  
(US\$ billion)



Notes: IMF resources numbers include resources currently in use. The short-run fluctuations represent movements in the SDR/dollar exchange rate.

Source: IMF.

Finally, there is an obvious political economy issue. Since the Bretton Woods conference, deep financial crises have occurred in developing and emerging market countries. Furthermore, according to Reinhart and Rogoff (2009), developed countries have not defaulted on their public debts since 1945. This explains why the developed countries have “explained” to the rest of the world how to manage their economies, often through the IMF. Now that most developed countries have faced an historical crisis, the superiority of their management cannot be taken for granted. This cannot fail but to have deep long-term consequences. The creation of the G20 was a first unmistakable signal. The G20 promptly obtained an increase in IMF resources ( ) and oversaw a modest redistribution of voting rights. Subtler changes have happened in the management structure of the IMF, although not yet at the top.

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each member country since national central banks have no autonomy.

Deeper changes will have to happen, although they will take years. Beyond personnel at the IMF and other international organizations (World Bank, WTO, Ecosoc, etc.), this might include the general orientation of IMF programs and the strategy regarding exchange and capital mobility regimes. As is well known, at the time of the Asian crisis, the IMF required deep policy retrenchment and urgent structural changes. This is not what most developed countries have done spontaneously as they were hit by the crisis. In the Euro Area, these classic requirements have been imposed on the crisis countries, but the IMF has made it known that it is not in full agreement and these policies do not have the hoped for effects. Quite clearly, the doctrine is likely to evolve. Similarly, calls for more exchange rate flexibility and more capital openness are being rolled back partly at the request of the non-G7 member countries of the G20.

### **Conclusions**

Coming on the steps of the Great Financial crisis, the Euro Area crisis is bound to have deep implications on a broad range of economic policies. This concerns the international monetary system. Drawing consequences, however, requires establishing the proper diagnosis. One objective of this paper has been to warn against radical conclusions. Although the Euro Area crisis is still unfolding and getting deeper and wider, it is highly premature to conclude that the euro has been failure and will disappear. The paper argues that the architecture of the European monetary union was essentially sound, yet included two flaws and allowed for a misuse of its rules once the crisis started. This diagnosis leads to less drastic implications than those that follow from a catastrophic view of the European architecture.

After all, the two flaws are not original. The first one, the failure to establish discipline in a federal arrangement, has affected many countries and is still present in several of them. The second flaw, ill-adapted banking regulation and supervisions is more the rule than the exception in most developed and emerging market countries. Both flaws are related to general political failures whose roots are well known and well explained. For the euro to survive, these flaws must be addressed. They already are, although the solutions adopted so far are likely to be short of what is needed. As always, it takes time to build solid institutions. Thus, the first conclusion is that the Euro Area is a very new arrangement, which will be improved over time.

The second conclusion is that monetary integration creates a dynamics of its own. Exchange rate arrangements cannot survive for long without deep central bank, which makes a monetary union eventually natural. The Euro Area experience shows that sovereignty in matters of fiscal discipline and banking supervision must be somewhat reduced. Creating the proper institutions and enforcement mechanisms is a complex and bold undertaking.

From there follows the third conclusion. Having demonstrated the growing needs for transfers of sovereignty, the Euro Area crisis is bound to bring to a halt efforts or just hopes of deep monetary integration elsewhere in the world. This, in turn, will postpone some changes in the international monetary architecture that could have



been inspired by a successful euro. The (admittedly distant) prospect of a few other monetary unions could have made it logic for the IMF to eventually recognize currency areas instead of governments. Such a step – which has been discussed in the case of Euro Area – would have made it possible to redistribute quotas and voting rights. Furthermore, in a world where a few currencies cover groups of important countries, the dollar's supremacy would have been on the wane. This challenge is now put on hold, probably for a long time.

The fourth main conclusion is that the scope for zero-sum game voting right redistribution at the IMF will be limited. On the other hand the Western powers that designed and managed the IMF since the Bretton Woods agreements have now suffered from crises that had been circumscribed to developing and emerging market countries. This opens the way to a change in the orthodoxy that has permeated the institution. Instead of focusing for formal changes in the management structure, reformers should promote a debate on the policies and conditions that the IMF promotes.

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## Session 1

# International Monetary System Reform



### Presentation 4

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## Reforming of International Monetary System and the Internationalization of the RMB: A Chinese Perspective

### Abstract

The paper starts with a discussion on the main flaws of the current international monetary system. Then it gives a brief overview of the proposals for the reform and their viability. It continues to elaborate the policy agenda at global, national and regional level. Finally, it analyzes the internationalization of RMB, focusing on its latest development and the reasons behind it, its benefits and costs, and its prospect. RMB's internationalization will continue as long as China can keep strong economic growth and its currency stable or mild appreciation. Since China may not remove capital control in the near future, the internationalization of RMB will mainly take the way of offshore market.

### 1. Main Flaws of the Current International Monetary System

The existing global reserve system is not only unstable but also unequal. It has three flaws. The first is its inherent instability, which was correctly described as *Triffin Dilemma* by Robert Triffin in 1961, i.e. the issuing countries of reserve currencies cannot maintain the value of the reserve currencies or the stability of its exchange rate while providing sufficient liquidity to the world. The financial history in the past three and half decades indicated that the US dollar has found very difficult to keep itself stable as a main reserve currency. With the large amount of current account deficits, US dollar suffered significant depreciation repeatedly, particularly in the beginning to 1970s, the mid of the 1980s and the period of 2002-2005. In each period, the large depreciation of the US dollar triggered financial turmoil and even economic recessions.

The second one is that there is a conflict between the target of monetary policy of reserve currency issuing country based on its domestic macroeconomic stability and the global need for reserve currency supply (Zhou, 2009). Moreover, any significant change and mistake in monetary policy of reserve currency country may have an unexpected and very often negative consequence to the rest of the world. Actually, the conflict may also be interpreted as a serious failure of policy coordination between reserve creating countries and reserve holding countries. Under the dollar-center regime, basically neither any single country nor IMF can cast any significant impacts on the US monetary policy or other macroeconomic policies.

The failure of the policy coordination has repeatedly brought financial instability to the relevant countries or even the entire world. For instance, the surge of US interest rate in the early 1980s resulted in the great shortage of liquidity and eventually triggered the international debt crisis. In contrary, the ease of the monetary policy during the 2002-2005 created a lot of the dollar reserve

supply and accordingly caused the continuous dollar depreciation.

The global imbalance, which reached its peak in 2006-2007, possibly is a latest example of the above conflict. Among the main interpretations for the recent global imbalance, based on the analysis by various economists, the most important ones may include excessive consumption in the United States, excessive savings in China and other East Asia countries which are basically results of unsophisticated domestic financial market and other structural weakness, and the new framework of international trade pattern, etc. However, it should be noted that the dollar-center reserve system does play an important role. With an *exorbitant privilege* of the dollar, United States had been keeping its monetary policy ease and accordingly indulging current account deficits in the first half of this decade. Actually, the loose money supply policy adopted by Mr. Alan Greenspan not only caused global imbalance but also became one of the main reasons for the sub-prime crisis.

The third flaw is that the dollar-center reserve currency system has a tendency to encourage capital move from poor countries to rich countries, as correctly discussed in the Stiglitz Report (Stiglitz Commission, 2009). Though it is not necessarily the case, United States does have been a net capital import country since the late 1980s, with a much clear and accelerated trend in the past few years. After the financial crisis in 1997, Asian emerging market economies tend to hold more pre-cautious foreign exchange reserves in the form of American treasure bill for preventing themselves from speculative attacks. The ratio of non-gold reserve to GDP rose from 3% in the end of 1980s to more than 30% in recent years. Among them, China is most aggressive. By the end of 2010, the ratio is about 55%, amounting to USD 2.8 trillion in absolute value.

In addition to the weaknesses with the reserve currency system, the current international monetary system has been encountering many other problems, including failure to avoid persistent global imbalance, high volatility of exchange rates among the major currencies, volatility and sudden reversal of the capital flows often triggering boom-burst circle in EMDEs, shortage of liquidity support during the crisis, and the inadequacy and less representativeness of the global financial governance.

## **2. Proposals for Reform and Their Viability**

For a long time, there has been an argument that the international monetary system should return to Gold standard. It is true that the Gold standard has many merits, such as exchange rate stability, automatic adjustment of balance of payments, and fiscal discipline, etc. However, we all know that the reasons behind its collapse in the early 20 century were the significant shortage of Gold production and supply, and the full abandon of government economic intervention facing with economic recessions. These problems are surely not avoidable if the world returned to the Gold standard. Thus, it is a proposal totally unrealistic.

Some economists, such as Richard Cooper (1987) argued that the aim of the international monetary system is to create a world currency. The world currency should be issued by a world central

bank and backed by a single monetary policy. In the transitional period, periphery countries may peg their exchange rates to the major international currencies. Eventually, the unification of major currencies may evolve into a single currency. This proposal is good for overcoming the problems that current system is facing with. But there is surely a long way to go for building up an institutional framework that makes the single world currency to work. It will be largely depend on the political will of the major economies.

More recently, a similar proposal was presented. According to Zhou (2009) and Stiglitz (2010), SDR should play as a global reserve currency in parallel with other major international currencies, and gradually replace US dollar as a dominant reserve currency. It is supposed to be realized under the IMF framework and does not need an establishment of new institution. But it is not easy as well. The main problem with the SDR proposal is that US has no incentive to carry it out. So it will hardly get support from IMF unless its governance can successfully be reformed.

Multi-polar reserve currency system is a proposal widely gained support. According to this proposal, several reserve currencies (most likely, US dollar, euro and yuan/yen/ACU) will play equally important roles in the global reserve system (Eichengreen, 2009). The most important merit of this proposal is that competition among the world's major reserve currencies can make the macroeconomic policy in reserve currency countries more disciplined. But, for realizing it, the euro needs to develop into a solid sovereign backbone through forming common fiscal policy. RMB, the Chinese Yuan's international usage and/or the Asian monetary integration needs to be developed as soon as possible.

Among various proposals, New Dollar Standard approach is also an influential one. The advocates of this proposal argue that US dollar could continue to play a dominant role in global reserve system, and the Fed could continue to provide sufficient liquidity, a kind of public good, to the rest of the world during the international financial crisis. Under the new dollar system, US should strictly maintain non-inflationary growth and fiscal sustainability domestically. The US and non-reserve currency countries should timely pursue policy adjustments to correct persistent current account imbalances. If US economic policy could be more disciplined, the New Dollar Standard might be the easiest way for the reform. However, it would be very difficult for US to give up the freedom of policy-making. And actually, neither the non-reserve currency countries would give up.

In conclusion, none of the proposals described above can be easily realized. The world single currency approach and SDR approach are probably most ideal, but it can only be reached in the long run. The new dollar standard is also good if US can be fully disciplined in policymaking. But it seems to be of very limited possibility, neither in the short run nor in the long run. The multi polar reserve currency system could be a realistic and second-best choice, but it takes time.

### **3. Policy Agenda**

The purpose of the international monetary system reform is to create a new institutional framework for more effective policy coordination among the main economies. Although the reform is

difficult indeed, under current global economic circumstance, we do need some policy agenda, which can not only be served as a short-term policy response, but also served as a part or first step of the process of the long-term reform. The policy agenda should include three levels: global, national and regional.

**At global level,** it is important to enhance the role of SDR even though we cannot expect a single world currency or SDR-based reserve currency to emerge in the near future. Whether SDR can become a principal reserve currency will depend on its supply and demand. In the supply side, a regular augment should be foremost important. After the SDR was initiated in 1969, it was allocated twice in the 1970-72 and 1979-81, totally amounting to USD 21.4 billion. In 2009, IMF decided to greatly enhance SDR allocation equivalent to USD 250 billion, following the suggestion of G-20 London summit. Even including the amount newly allocated, the stock of SDR is only an equivalent to about 5% of the global non-gold reserves in total. If the SDR can be issued and allocated in equivalence of USD 150-300 billion each year according to the proposal by Stiglitz Report, then its stock will reach a level of about 50% of the non-gold reserve ten years later.

Since the increase of allocation of SDR may challenge the principal role of US dollar, it should be reasonable to speculate that United States is unlikely to have much incentive to push the reform. Given the current governance of IMF, it should be necessary to accelerate the reform of IMF and make its governance more reasonable, widely representative and more democratic.

In the demand side, how to make the SDR more attractive is a big challenge. Since it came forth, SDR has been a kind of credits given by the IMF that can be converted into dollars and other currencies at the IMF, and be used in official transactions among member countries. For making the SDR more attractive, Eichengreen (2009) argued, it is useful for IMF itself or by encouraging member countries to issue SDR-denominated bonds. Furthermore, creating an active SDR market by extending the use of SDR into commercial area might be a useful step.

In addition to enhancing the role of SDR, it is important to strengthen IMF. Since it came forth, SDR has been a kinant economies. Particularly, it would be crucial to have the Mutual Assessment Process really work, not only for emerging economies but also for the main developed economies. Besides, the main economies should make G-20 summit a productive mechanism for macroeconomic policy coordination.

**At national level,** to avoid the permanent global imbalance and keep exchange rates at reasonable levels are always in the center of macroeconomic policy coordination. In order to reach this goal, both deficits economies and surplus economies should work together. By return to normal monetary policy, fiscal consolidation and various structural reforms, United States and other current account deficit countries should avoid possible rebound of external imbalance. Through persistent efforts of enlarging domestic demand and various structural adjustments, including switch to a more flexible exchange rate regime, China and other surplus countries should avoid fundamental external disequilibrium. It is noted that the main reasons behind the external imbalance in China are structural

weakness. Therefore, it is important for China to accelerate its structural reforms, such as domestic financial liberalization and the social security network reform, in addition to the exchange rate regime reform.

**At regional level,** both EU and Asia should strengthen their regional integration since multi-polar reserve currency system will be the most realistic choice in the coming years or even decades. EU countries should strengthen its mechanism of macroeconomic policy coordination, including creating common fiscal policy and more efficient crisis rescue mechanism, in order to defense its outcome of regional monetary integration. Although not very optimistic, Asia countries should gradually push forward their monetary and financial integration process, by strengthening the role of AMRO and making CMIM more effective.

#### **4. The Internationalization of RMB**

##### **1) Progress of Internationalization of RMB**

###### **Currency Swap with Foreign Central Banks**

Owing to the fact that the multi-reserve currency regime would be more realistic in the short term and even in the mid-term, extending RMB in the coming usage therefore should be a reasonable choice for China. Actually, China has started to expand the international usage of its currency or so-called RMB internationalization since the outbreak of the sub-prime crisis. In 2008 and 2009, China signed eight currency swap agreements with six Asian countries and two countries from the rest of the world. Since then, the total amount of RMB swapped has increased rapidly, reaching over 2 trillion CNY by the March of 2012 (see table 1). The currency swaps are expected to facilitate liquidity support in the counterpart countries and more or less help RMB become a reserve currency.



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International Monetary System, Energy and Sustainable Development

**Table 1: Bilateral Currency Swap Agreements**

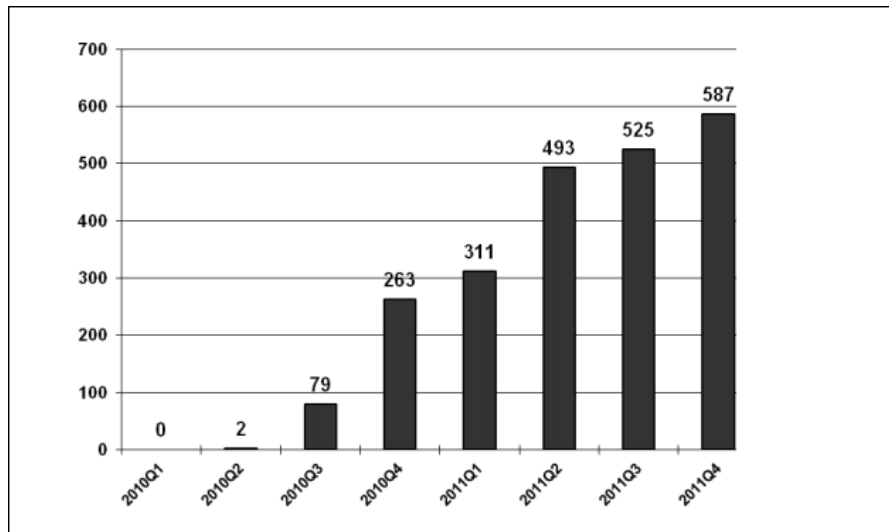
Date of signing	With Countries or Regions	Place of signing	Value	Period of validity
2008.12.12	Korea		1800 billion YUAN	
2009.1.20	Hong Kong		2000 billion YUAN/ 2270 billion HKD	3 years
2009.2.8	Malaysia		800 billion YUAN/400 billion MYR	
2009.3.11	Belarus		200 billion YUAN /8 trillion BYR	
2009.3.23	Indonesia		1000 billion YUAN /175 trillion IDR	3 years
2009.4.2	Argentina		700 billion YUAN	
2010.6.9	Iceland		35 billion YUAN	3 years
2010.7.23	Singapore		1500 billion YUAN /300 billion SGD	3 years
2011.4.18	New Zealand		250 billion YUAN	
2011.4.19	Uzbekistan		7 billion YUAN	
2011.5.6	Republic of Mongolia	Ulan Bator	50 billion YUAN	
2011.10.26	Korea	Seoul	3600 billion YUAN /64 trillion WON	3 years
2011.11.22	Hong Kong	Beijing	4000 billion YUAN /4900 billion HKD	3 years
2011.12.22	Thailand	Bangkok	700 billion YUAN /3200 billion THB	3 years
2011.12.23	Pakistan	Islamabad	100 billion YUAN /1400 billion PKR	3 years
2012.1.17	the United Arab Emirates	Dubai	350 billion YUAN /200 billion AED	3 years
2012.2.8	Malaysia		1800 billion YUAN /900 billion MYR	3 years
2012.2.21	Turkey	Ankara	100 billion YUAN /30 billion TRY	3 years
2012.3.20	Republic of Mongolia	Beijing	100 billion YUAN / 2 trillion Tuglij Te	
2012.3.22	Australia	Beijing	2000 billion YUAN /300 billion AUD	3 years

Source: China State Administration of Foreign Exchange.

### Trade Settlement in RMB

In April 2009, the Chinese government announced a pilot scheme of cross-border trade settlement in RMB. In July, Trade companies in five experimental cities were allowed to join the scheme and use RMB as a settlement currency in their trade with Hong Kong, Macau and some ASEAN countries. One year later, the scheme was extended to over 20 provinces and all the regional restrictions were removed. As a result, the amount of RMB trade settlement has increased dramatically since the third quarter of 2010. According to the Hong Kong Monetary Authority (HKMA), in 2011, the volume of RMB trade settlement conducted through Hong Kong, which was about 75% of the total, reached 1.9 trillion yuan (Figure 1).

**Figure 1: Increase of Trade Settlement in RMB in Hong Kong**

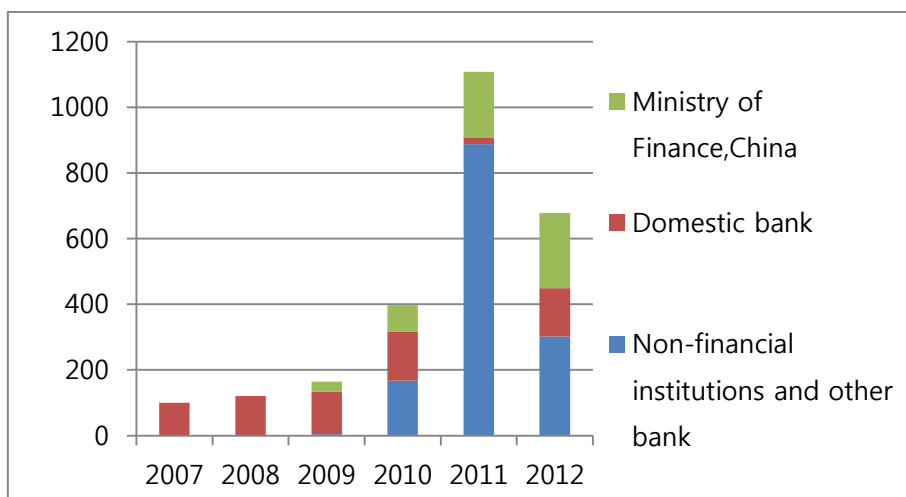


Source: Zhang (2012)

### **Issuance of RMB denominated Bonds**

The earliest issuance of RMB denominated bonds came forth in October of 2005, when International Finance Corporation and Asian Development Bank raised fund through issuing RMB denominated bonds in Hong Kong. In June of 2007, In June of 2007, China Development Bank issued 5 billion yuan RMB denominated bonds, followed by an issuance of 6 billion yuan by the China Ministry of Finance two years later. More recently, many Chinese financial institutes, such as Bank of China, Export and Import Bank of China, Ping-An Asset Management, and foreign financial corporate and multinational enterprises joined the issuance of RMB denominated bonds there (see Figure 2). By August of 2012, the numbers of this kind of the issuance have been over 180, reaching an amount of 221.8 billion.

**Figure 2: Issuance of RMB Denominated Bond in Hong Kong, 2007-2012**

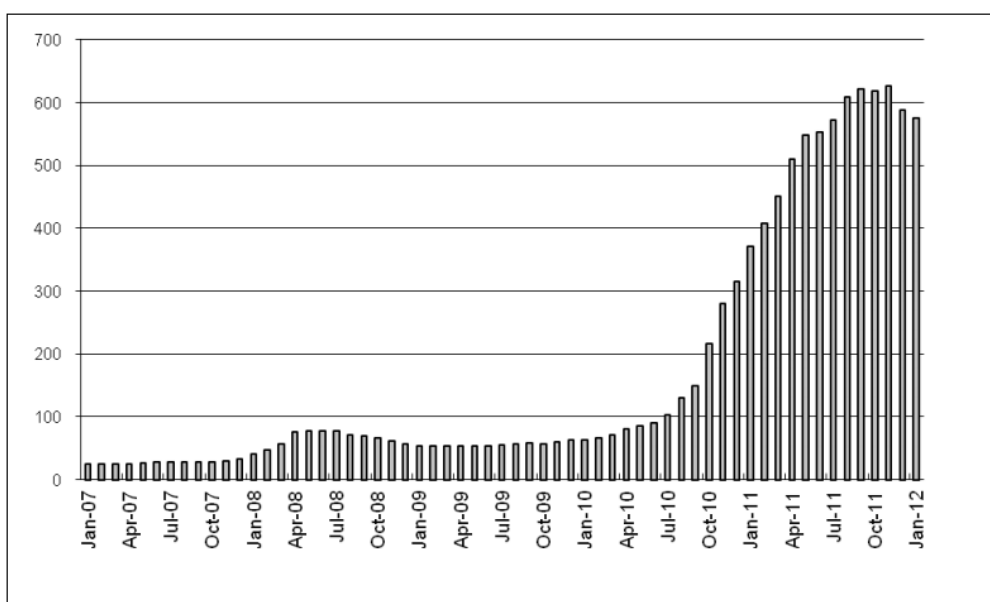


Source: Wind Data; Note: the statistic for 2012 is till August.

### RMB Deposits in Hong Kong

Although Hong Kong banks were awarded license to run RMB deposit business in 2004, the amount of the RMB deposit only increased rapidly in the past two or three years largely due to the significant increase of usage of RMB in trade settlement bond issuance. As of July 2011, the total amount of RMB deposits was 580 billion yuan, equivalent to HK\$ 899 billion and accounted for 9.5% of the total HK\$947 billion of deposits in Hong Kong, China—up from less than 2 % just a year ago. (see Figure 3).

Figure 3: The Increase of RMB deposits in Hong Kong



Source: Zhang (2012) and Yu (2012)

### 1) Reasons Behind the Rapid Development of RMB Internationalization

Why the internationalization of RMB has developed so rapidly over the past years?

Basically, as officials from PBOC mentioned, the internationalization of RMB is a market driven process rather than a government driven one. It is interesting to point out that the following factors may more or less push forward the process.

Firstly, the increasing trade between China and most of the Southeast Asian countries, especially with the large amount of deficits on China side, has played an important role.

Secondly, the continuous appreciation (until last year) of RMB encouraged the foreign importers to settle their trade in RMB. And it also encouraged the investor to buy the RMB denominated bonds and hold other RMB denominated assets including the bank deposits.

Thirdly, given that the global financial instability caused by the American sub-prime debt crisis and Euro-zone crisis, many emerging economies have suffered from capital outflows and liquidity shortage. For dealing with the possible liquidity problems, it is natural for the central banks from these economies to sign currency swap agreements with China, a country holding the largest foreign exchange reserves in the world.

Fourthly, since the return to China in 1997, Hong Kong has been trying to strengthen its role of international financial center through the support from central government. The HK Special Administration has constantly requested the Beijing government to allow banks and other financial institutes in Hong Kong to run RMB business, for keeping prosperity in its banking sector.

## **2) The Benefits and Pitfalls of Internationalization of RMB**

Regarding benefits, first of all, the international usage of RMB should be beneficial to mitigate the flaws of the existing global monetary system and therefore enhance the global financial stability. First, if RMB eventually becomes a part of the multi-reserve currency regime, the problem with Triffin Dilemma could be alleviated in some degree. Second, when more currency competitions are present, the main reserve currency issuing country may become more careful with its monetary policy, particularly the abuse of ease monetary policy. Accordingly, the global imbalance may be alleviated.

Secondly, the international usage of RMB is likely to be a new vehicle of the Asian monetary and financial integration, which could be an important part of the ongoing reform of the global monetary system. While more and more currency swap agreements, intra-regional trade and investment are denominated in RMB, Asian countries will have an increasingly strong motivation to keep their currencies pegged to RMB and eventually make RMB an important reserve currency in this area. When RMB becomes a most important currency for denomination, pricing and store in value, the chance for Asian countries to create a fixed exchange regime or single currency zoo may largely increase.

Thirdly, at the national level, China may also gain some benefits. First, as Yu (2012) mentioned, the internationalization of RMB may reduce China's currency zoo may largely increase. Currencies pegged to RMB assign more responsibility to the United States. Second, China may largely reduce its currency mismatch in its external trade and investment, which would improve the productivity of

enterprises and reduce the macro-economic instability. Third, as a further step of opening up, the RMB internationalization will most likely push forward China's domestic economic reform, particularly the financial market; because a more opened economic structure would request more institutional domestic reform according to the related experiences in China over the past decades.

The main pitfall of the internationalization of RMB is complicating the environment of China's trade and investment. When RMB become an international currency, PBOC will have to pay great attention to the scale of the cross-border moving of RMB and its potential shocks to the financial stability.

### **3) The Future of the Internationalization of RMB**

Many economists believe that the internationalization of RMB should be a long term process even though China has become the leading trade country and the second largest economy in the world, owing to the fact that China's domestic financial market is still immature and its capital account is not fully opened. It is true that a highly developed financial market and an opened capital account will significantly push forward the process and well facilitate the internationalization of RMB. Therefore, China should accelerate its domestic financial reform, especially liberalization of the interest rate, improve the liquidity of financial market through strengthening financial innovation in instruments and institutional arrangement and increase the openness of the financial sector through allowing more freely entry of qualified foreign banks and non-bank financial institutes.

However, it could be wrong to argue that the internationalization of RMB is unlikely to make any further progress until China fully liberalize its capital account. The rapid development of HK offshore RMB market over the past years has just shown that the internationalization of RMB could reach some progress even though China remains its capital control. In fact, the Eurodollar market in 1950s and 1960s provided a very interesting historical precedent, where the US dollar became much more influential as an invoice and settlement currency through offshore market given that American domestic financial market remains many restrictions including controls on cross-border capital movement.

Looking forward, as long as China believes that the internationalization of RMB is unlikely to make any further progress until China fully liberalize its capital account. The rapid development of HK offshore RMB market over the past years has just shown that in addition to Hong Kong, it seems reasonable to predicate that Tokyo, Singapore, Bangkok and other cities in the ASEAN countries should play important roles in the development of offshore RMB market, since most of these cities own well-developed financial markets and institutions. Besides, learning experiences with banking facilities in New York in the end of 1970s, China may also set up similar Banking Facility in Shanghai or Shenzhen a special liberalized zone in the onshore market.

In the coming years, if China can successfully accelerate its domestic financial reform and gradually liberalize its capital account, the internationalization of RMB may also be pushed through

the onshore market. Particularly, the target of building up Shanghai into an international financial center before 2020 could be a great vehicle to realize the internationalization of RMB through onshore market, and become a competitive force against the offshore market. However, basically, it is still unclear how far China will go toward an open capital account in the coming few years.

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## Session 1

# International Monetary System Reform



### Presentation 5

## Sungmin Kim

Professor at KAIST, Korea

Dr. Sungmin Kim currently works as a professor of Graduate School of Finance and Accounting at KAIST after more than 30 years' service at the Bank of Korea. He received his B.A. and M.A. in economics from Yonsei University and Brown University respectively and his Ph.D. in business administration from Texas Tech University, majoring in finance. He wrote his dissertation on the default risk premium on high-yield US corporate bonds.

Dr. Kim worked first in the Research Department of the Bank of Korea, where he wrote many research papers on corporate finance and monetary policy. He worked next in the International Department, where he was in charge of foreign exchange market operations as Head of the Foreign Exchange Market Division (1994-1995). Subsequently, in the Monetary Policy Department, he accumulated broad experiences and knowledges on issues regarding monetary policy implementation and the financial markets. In particular, he was in charge of domestic monetary operations as Head of the Market Operations Division (1997-1999), in which capacity he contributed to stabilizing the financial markets through open market operations during the 1997 Asian Financial Crisis and to providing technical assistance for detailed institutional setting up of the government bond markets. Dr. Kim then served as Head of the Fixed Income Market Analysis Team (1999-2002), helping to stabilize the corporate bond markets in the aftermath of the Daewoo collapse in July 1999 and to further develop the government bond markets, for example by conducting a joint project with the World Bank on a "Proposal for Further Activating Secondary Markets for Korean Government Bonds". After working at the Bank's Washington Representative Office (2002-2005) and the Daegu and Gyeongbuk Branch (2006-2009), he served as Head of the G-20 Affairs Office at the Bank of Korea where he was deeply involved in discussing and negotiating most of the G20 agenda items of the G20 process. He worked as a



member of the G20 working groups including those regarding the “Framework for Strong, Sustainable and Balanced Growth” and “International Monetary System”.

Dr. Kim also worked in the Central Asia Department of the IMF from 1992 to 1993. Based upon this experience, he subsequently played a significant role as an Advisor to the IMF Monetary Affairs and Exchange Department on various occasions between 1998 and 2005, when he provided technical assistance on monetary operations and fixed income market developments to other central banks, including the Peoples Bank of China and the Central Bank of the Philippines. At the same time, he occasionally taught courses on corporate finance and the international financial markets to MBA students as an adjunct professor at Hanyang University, Sogang University and Yonsei University.

Dr. Kim has written numerous papers on monetary policy, corporate finance, financial markets, and challenges of the Korean economy, including two papers in BIS publications (one on monetary operating procedures in Korea and the other on Korean corporate bond market development after the 1997 crisis) and two books. In addition, as Director-General of the Bank’s G20 Affairs Office, he has contributed four papers to G20-related seminars and conferences, including “Korea’s Experience of Crisis and Recovery: Comparing the 1997 and 2008 Crises”, for the Korea-FSB Financial Reform Conference: An Emerging Market Perspective.

Dr. Kim’s major areas of interest include financial markets in particular fixed-income markets and financial institutions, corporate finance, micro and macro financial economics, international finance and international financial markets, and monetary economics and policy

## The G20 Agenda for More Resilient Global Financial System: Stocktaking and Remaining Challenges

### I. Introduction

It has been five years since what is generally considered to be the start of the recent financial crisis, August 2007. Also it has been four years since the collapse of Lehman Brothers on September 2008, the event which triggered the crisis to spill over across the global economy. Yet the global financial crisis is the on-going process in other part of the world, notably in the euro area and the aftermath of the crisis has afflicted the global economy.

At the same time, the recent unprecedented global financial crisis played a pivotal role in making the G20 the premier forum for discussions of global economic issues. Since the crisis has provided the impetus for a major overhaul of the financial regulatory system, one of key issues for the G20, of course, is to build a new regulatory framework for more resilient financial system. However, it must be emphasized that the objective of the financial regulatory reform pursued by the G20, is not to merely respond to the crisis, but to re-establish the overall financial system, to prevent recurrence of future crises.

In assessing the progress of the G20 agenda of financial regulatory reform, it is important to recall the financial regulatory framework that had been going on in the run-up to the recent financial crisis. Beginning in the 1970s, the separation of traditional lending and capital markets activities began to break down under the weight of macroeconomic turbulence, technological and business innovation, and competition<sup>1</sup>. The dominant trend was the progressive integration of these activities. This, in turn, accelerated the dramatic expansion of the shadow banking system, including the notable growth of securitization and derivatives. Furthermore, the rapid growth of the shadow banking system lowered the effectiveness of financial supervision centered on bank regulations.

During the period from the 1970s until the recent financial crisis, the basic approach to financial regulatory framework was a “hand-off” approach, based upon the following two presumptions. The first presumption was that competition would enhance the efficiency of financial systems by accelerating innovation in financial instruments and management. The second presumption was that new financial instruments being developed would ensure a safer financial system through the diversification of risk.

Contrary to these two presumptions, however, the financial system was exposed to greater structural vulnerabilities, as demonstrated by the global financial crisis. In particular, growing integration of traditional lending and capital markets activities has facilitated competition among

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<sup>1</sup> Daniel K. Tarullo, “Regulatory reform since the financial crisis”, Speech at the Council on Foreign Relations C. Peter McColough Series on International Economics, New York, 2 May 2012

financial institutions. Faced with fierce competition however, financial institutions pursued a strategy to increase their sizes in an attempt to take advantage of so-called “too-big-to-fail” subsidy in their funding, owing mainly to the implicit government guarantee and took excessive risks in pursuit of higher yield. Meanwhile, the financial innovation that had been expected to diversify risks actually made financial system more complex and opaque. Lack of transparency and limited disclosure of the types and locations of risk made it difficult to assess the extent of exposures and potential spillovers, so that it became extremely difficult to detect the build-up of risks. Also, the financial system became over-leveraged and heavily interconnected. The heavy reliance on leverage in asset management also exacerbated pro-cyclicality, damaging the overall stability of the financial system.

In this context, it should be mentioned that the financial crisis has shown the weakness of the traditional financial stability framework. This framework included three components: supervision of individual financial institutions; oversight of payment and settlement systems and other key market infrastructures; and monitoring of the functioning of financial markets

In this setting, since systemic risk was seen as a remote possibility, policymakers could rely on the resilience of the financial system<sup>2</sup>. In particular, there was no serious awareness that the global financial crisis could happen. Since neither the statutory framework for, nor supervisory oversight of the financial system adapted to take account of the new risks posed by the broader trend, the financial industry, to a large extent, had been a disaster waiting to happen.

The structural vulnerabilities that surfaced during the recent crisis were not confined to the management of individual financial institutions, but spread to include the financial system as a whole. In this regard, the G20 reform on financial regulatory reform must therefore be very comprehensive.

Realizing these serious drawbacks of the traditional financial stability framework, many policymakers have suggested the essential elements of a new global financial stability framework<sup>3</sup>. Although these elements might be slightly different from a person to a person, there is some consensus among policymakers, particularly among the G20 members, on the essential elements to be included in a new global financial stability framework.

The first element is that a new framework is needed to make sure a level playing field in regulation. This means that global coordination is required in designing a new regulatory framework in order to minimize the scope for cross-sector and cross-border regulatory arbitrage. In this context, it is utmost important that a new framework should be able to address emerging exposures and risks in the entire financial system, not just the banks. Otherwise, there is a danger that riskier activities and products will migrate to less regulated segments of the system, as occurred with shadow banking

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<sup>2</sup> Herve Hannoun, “Towards a Global Financial Stability Framework”, A speech at the 45th SEACEN Governors’ Conference 26-27 February 2010

<sup>3</sup> For example, see Vinals, Jose, Jonathan Fiechter, Celya Pazarbasioglu, Laura Kodres, Aditya Narain, and Marina Moretti, “Shaping the New Financial System”, IMF Staff Position Note.(SPN/1015) October 3, 2010, International Monetary Fund and Herve Hannoun, “Towards a Global Financial Stability Framework”, A speech at the 45<sup>th</sup> SEACEN Governors’ Conference 26-27 February 2010

system, notably off balance-sheet investment vehicles during the recent financial crisis.<sup>4</sup>

The second element is that the focus needs to be system-wide, taking into account the mutually reinforcing interactions between the financial system and the macro-economy. This reflects the recognition that micro-prudential regulations which aim to improve the resilience of individual institutions are a necessary condition, but not a sufficient condition for a financial stability. Therefore, we need to incorporate the traditional framework with effective macro-prudential regulations that strengthen the resilience of the financial system as a whole. This includes a reduction of a pro-cyclicality of a financial system by adopting a holistic approach to mobilize prudential, monetary and fiscal policies in complementary ways.

The third element is a need to make resolution as a viable option to handle failed financial institutions at both a national level and for cross-border financial institutions. At the national level, it is essential to have effective policies and procedures for resolving failed financial institutions in a prompt and orderly manner. At the same time, given the increasing cross-border activities of financial institutions, it is also important to have an enhanced cross-border framework for resolution to minimize moral hazard while preserving financial stability.

The final element is that a new system should be able to improve the effectiveness of supervision. Strengthened supervision is a necessary condition to prevent excessive risk taking. Consequently, supervision needs to be more intensive and intrusive. In particular, given global integration of financial markets, more effort should be devoted to supervising cross-border exposures.

Against this backdrop, this paper updates a stocktaking of the G20 agenda toward more resilient financial system including: Basel III; regulations on systemically important financial institutions and shadow banking system; improvement of financial market infrastructures; and other issues. This paper then focuses on some of the remaining challenges of the G20 agenda.

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<sup>4</sup> Vinals, Jose, Jonathan Fiechter, Celya Pazarbasioglu, Laura Kodres, Aditya Narain, and Marina Moretti, "Shaping the New Financial System", IMF Staff Position Note,(SPN/1015) October 3, 2010, International Monetary Fund

## II. Stocktaking of Financial Regulatory Reform Agenda

### 1. Basel III

The recent global financial crisis clearly revealed several serious shortcomings of the Basel II. On the one hand, Basel II capital standards did not work as intended to absorb losses. Consequently, a number of distressed banks had to be rescued by capital injection from taxpayers' money. Moreover, this inadequate level of capital was of insufficient quality. For instance, Tier 2 capital instruments, mainly subordinated debt, and in some cases non-common equity Tier 1 capital, did not absorb losses incurred by stressed banks during the crisis. On the other, the Basel II failed to ensure adequate liquidity buffers to protect the banking system from unforeseen risks.

On 16 December 2010, the Basel Committee on Banking Supervision (BCBS) released the Basel III rules, which is the core of the financial regulatory reform initiated by the G20 in an attempt to correct the deficiencies of Basel II revealed by the crisis, with the endorsement of the G20 Seoul Summit in November. Although Basel III may be regarded as an extended version of Basel II, it is different from Basel II in the following ways. For one thing, Basel III encompasses a broad array of risks since it not only tightens capital requirements, but also introduces liquidity standards and leverage ratio requirements. For another, Basel III explicitly addresses macro-prudential aspects of banking system stability.

Basel III combines a micro-prudential dimension designed to limit distress of individual banks and a macro-prudential dimension designed to limit system-wide financial distress together. Consequently, the enhanced Basel II framework and the macro-prudential overlay are together being referred to as Basel III<sup>5</sup>. Micro-prudential framework is provided by an enhanced Basel II framework, which aims to increase the resilience of individual financial institutions. An enhanced Basel II includes: raising the quantity and the quality of Tier 1 capital; ensuring the adequate capital charges on banks' trading book; strengthening the risk management and disclosure practices of banks; introducing a leverage ratio to complement risk-weighted measures; and addressing counterparty credit risk posed by over-the-counter (OTC) derivatives.

The macro-prudential overlay has two dimensions: the time dimension and the cross-sectional dimension. The time dimension seeks to ensure the financial stability over time. In particular, the time dimension of the macro-prudential overlay addresses pro-cyclicality between the financial system and the real economy. Policy instruments for this purpose include counter-cyclical capital charges, forward looking provisioning for loan losses, and capital conservation rules for banks. The cross-sectional dimension of the macro-prudential overlay addresses the financial stability at each point in time. Tools

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<sup>5</sup> Herve Hannoun, "Towards a Global Financial Stability Framework", A speech at the 45<sup>th</sup> SEACEN Governors' Conference 26-27 February 2010

for this purpose include a systemic capital surcharge for systemically important financial institutions (SIFIs), systemic oversight on the inter-linkage between common exposures of all financial institutions such as the OTC derivatives markets, building more resilient financial market infrastructures, and replacing the web of bilateral exposures with robust central counterparties (CCPs).

### 1-1 Strengthening Capital Requirements

Basel III substantially raises the quality as well as the quantity of regulatory capital with a greater emphasis on common equity. While robust bank capital requirements alone cannot guarantee the safety and soundness of our financial system, they are essential ingredients for effective financial regulation, precisely because they are available to absorb all kinds of potential losses.

To improve the quality of capital, the BCBS has tightened the definition of common equity and limits what qualifies as Tier 1 capital. In order to ensure that the predominant form of Tier 1 capital is tangible common equity which has higher loss-absorbing capacity, intangible assets such as good will and other deductions are excluded from the core Tier 1 capital, as regulatory capital will consist of common equity and retained earnings for higher loss absorbing capacity in times of distress.

In this context, it is worthwhile to recall that the original rationale for Basel's two tiers of capital requirements<sup>6</sup> was that Tier 1 capital would be available to absorb losses so as to allow the firm to continue as a going concern, while the additional Tier 2 capital would be available to absorb losses if the firm nonetheless failed. The various Basel frameworks have tried to strengthen both the quantity and quality of required Tier 1 capital.

Also the Basel Committee has strengthened capital regulations so that capital adequacy ratios are applied not only to total assets but also to individual items. Specifically, the ratios of total capital (Tier 1 + Tier 2), Tier 1 capital, and the common equity components of Tier 1 capital to risk weighted assets should exceed 8.0%, 6.0%, and 4.5%, respectively.

One important issue in the context of strengthening quality of capital is to build "bail-in" system which can facilitate the expansion of capital in times of crisis. The concept of so-called "bail-in" as opposed to "bail-out" was originally proposed by two economists of Credit Suisse in their article in the Economist in January 2010<sup>7</sup>. The idea of "bail-in" is that a bank's creditors agree in advance to have restructuring the liabilities of a distressed financial institution by writing down its unsecured debt and/or converting it to equity if the bank is in trouble. More specifically, they proposed a new process for recapitalizing failing banks by using contingent convertibles, the so called COCOs<sup>8</sup>. These debt-

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<sup>6</sup> The Basel Committee distinguishes between going-concern capital (Tier 1) and gone-concern capital (Tier 2). Going-concern capital is available to absorb losses while a financial institution remains solvent. Gone-concern capital absorbs losses following insolvency and during liquidation of these assets.

<sup>7</sup> Calello, Paul and Wilson Erwin, "From Bail-out to Bali-in", The Economist, January 28, 2010

<sup>8</sup> The term "bail-in capital" and "COCOs" are often used interchangeably. But it is useful to make a distinction. According to PWC, bail-in capital is defined as instruments where write downs are triggered by the regulator at the point of non-viability whereas COCO instruments are those that converts to equity when pre-defined trigger point is passed as going concern. See PWC, "The trillion dollar question: can bail-in capital bail out the banking industry?", Basel III and beyond, November 2011

like instruments convert to common equity when a bank's regulatory capital is reached or falls below a predetermined threshold, providing a buffer during a period of stress. The extra capital they provide directly might be sufficient for moderately-sized stress events. Also, they argued that a well-designed contingent capital instrument can create good management incentives – for example, encouraging more capital to be raised early in a crisis, and focusing boards and managers on risk management.

The policymakers have given more attention to their proposal since the statutory bail-in power could achieve a prompt recapitalization and restructuring of the distressed financial institutions without taxpayers' money. In fact, the idea was implemented in Switzerland. More specifically, Credit Suisse and UBS will have to hold total capital equivalent to 19 per cent of the risk-weighted assets (RWAs) on their balance sheets. Some 10 per cent of the RWAs must be held in the form of common equity, but 9 per cent get to come in the form of COCOs. For the implementation of the Swiss requirements, the same timeframe will apply as in the case of Basel III.

The BCBS had reviewed the use of contingent capital instruments such as COCOs as vehicles for providing additional loss absorbency as “early-trigger” contingent capital<sup>9</sup> could help absorb losses on a going-concern basis. After an in-depth review, on 13 January 2011, the Basel Committee announced that all non-core equity capital instruments of internationally active banks would have to have bail-in features. The terms and condition of all non-common Tier 1 and Tier 2 instruments issued by an internationally active bank must have a provision that requires such instruments, at the option of the relevant authority, to either be written off or converted into common equity upon the occurrence of the trigger event. More specifically, all non-common equity Tier 1 capital, and all Tier 2 capital should convert to common equity as soon as authorities make a capital injection to save the firm. This should encourage the holders of these instruments to assess the risk of failure and price them accordingly, providing an additional source of market discipline and reducing moral hazard. According to the IMF study<sup>10</sup>, “bail-in” as a going-concern form of resolution could mitigate the systemic risks associated with disorderly liquidations, reduce deleveraging pressures, and preserve asset values that might otherwise be lost in liquidation.

Nevertheless, there are some concerns and issues to be resolved in practice. Obviously, one big concern is that any effort to adopt bail-in could require significant changes to the rights of creditors. Another concern is: if the use of a bail-in power is perceived by the market as a sign of the concerned institution's insolvency, it could trigger a run by short-term creditors and aggravate the institution's liquidity problem. In addition, one critical issue to be resolved is how to make the trigger for bail-in power consistent with those used for other resolution tools. Other essential issues include building a clear and coherent legal framework for bail-in, establishing balance the rights of private stakeholders

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<sup>9</sup> So-called “early trigger” or “higher-trigger” COCOs convert to common equity well before a bank has become non-viable., whereas “Late-trigger” COCOs, which convert when a firm is no longer viable, are better understood in the context of strengthening resolution.

<sup>10</sup> Zhou, Jiangping, Virginia Rutledge, Woulter Bassu, Marc Dobler, Nadege Jassaud, and Michael Moore, “from Bail-out to Bail-in: Mandatory Debt Restructuring of Systemic Financial Institutions”, IMF Staff Discussion Note (SDN/12/03), International Monetary Fund, April 24, 2012

and the public policy interest in preserving financial stability.

### **1-2 Introducing a leverage ratio**

Under Basel II, banks can choose to calculate the size of their risk-weighted assets using either the standardized approach based on external credit or the internal rating-based approach. In most cases, these calculations refer only to assets that are held on balance sheet, without considering off-balance sheet assets.

Given the difficulties for supervisors and regulators in monitoring bank's assets and their complexity, the Basel Committee has introduced a simple leverage ratio to complement risk-weighted measures. The new leverage ratio includes not only exposures from on-balance sheet but also off-balance sheet positions, in order to correct the risk measurement errors of the Basel II framework and reflect off-balance sheet transactions accurately. Under this new regulation, banks should maintain at least 3% of the leverage ratio, which is defined as the ratio of Tier 1 capital to nominal value of assets including off-balance sheet assets. In the meantime, the BCBS will that the leverage ratio will be applied in a globally consistent manner, a Pillar 1 treatment, after adjusting the difference in accounting standards.

### **1-3 Introducing liquidity standards to internationally active banks**

Before the recent financial crisis, many banks had operated with strikingly thin liquidity margin, relying heavily on wholesale funding. They did not imagine that entire markets could freeze up. Also they did not anticipate an extended period of illiquidity. At the height of the crisis, counterparties lost confidence in the liquidity of many banks, severely straining their access to wholesale funding. As we have seen from the case of Northern Rock in September 2007, a financial firm with significant amounts of short-term funding can become illiquid before it becomes insolvent, as creditors run in the face of uncertainty about the firm's solvency. Higher levels and quality of capital can mitigate some of this risk, but not much. Therefore, it was widely agreed among regulators that quantitative liquidity requirements should be developed.

In order to address immediate liquidity problem, the BCBS released "Principles for Sound Liquidity Risk Management and Supervision" in 2008. Later, in an attempt to complement "the 2008 Principles, the BCBS introduced two standards of liquidity: one is the Liquidity Coverage Ratio (LCR) with a 30-day timeframe; the other is the Net Stable Funding Ratio (NSFR) with one year timeframe. The LCR<sup>11</sup> is designed to bolster the short-term resiliency of an institution's risk profile, by ensuring that it has sufficient high quality liquid resources to survive an acute stress scenario lasting for one month. The NSFR<sup>12</sup> requires a minimum amount of stable sources of funding at a bank relative to the

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<sup>11</sup> Highly liquid assets / net cash outflows over 30-day time period e, are

<sup>12</sup> Available stable funding / required stable funding y time



liquidity profiles of the assets, as well as the potential for contingent liquidity horizon, needs arising from off-balance sheet commitments, over a one-year horizon. The NSFR aims to limit over-reliance on short-term wholesale funding during times of buoyant market liquidity and encourage better assessment of liquidity risk across all on- and off-balance sheet items.

#### **1-4 Mitigating pro-cyclicality**

Pro-cyclicality describes the self-reinforcing mechanism within the financial and between the financial system and the real economy that can exacerbate boom and bust cycles, undermining financial and macroeconomic stability<sup>13</sup>. To help mitigate pro-cyclicality in the financial system, Basel III provides a mechanism in the regulatory capital to build up and run down capital buffer in countercyclical fashion over the business cycle. In particular, the BCBS came to a conclusion that it would not be possible to achieve greater sensitivity across institutions at a given point of time without introducing a certain degree of cyclicality in minimum capital requirement<sup>14</sup>. These safety capital buffers must build up in good times in preparation for future difficulties. Such a build-up can possibly be served as a measure to contain excessive risk-taking during the up phase of the business cycle. However, in bad times, these buffers can be run down, allowing the system to absorb emerging strains more easily.

More specifically, the BCBS has established the following measures in addressing pro-cyclicality. First, the default rate using the “Through-the-Cycle” (TTC) rating system will be used instead of that of the “Point-in-Time” (PIT) rating system, to flatten the capital formula.

Second, the Basel III introduces a capital conservation buffer, a buffer that is fixed regardless of the economic cycle, which will be used to absorb losses during periods of financial stress. As a bank’s capital level moves closer to the minimum requirement, the capital conservation buffer imposes a progressively tightened constraint on the bank’s discretionary distributions, such as dividends. Retaining bigger proportion of earnings during a downturn will help ensure that capital available to support banks’ ongoing business operations during the financial distress.

Finally, a counter-cyclical capital buffer, a variable buffer applied in accordance with macro-economic conditions, is introduced. In other words, supervisors will be able to impose a countercyclical buffer on their banking system when credit growth seems to be getting out of hand, with a reference to the ratio of aggregate credit to GDP. This buffer has the effect of restraining excessive credit expansions during economic booms and preventing sudden credit contractions during economic busts. A countercyclical buffer will be at national regulatory authorities’ discretions. The authorities will impose this buffer only when they judge that credit growth is resulting in unacceptable build-up of systemic risk.

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<sup>13</sup> Herve Hannoun, “Towards a Global Financial Stability Framework”, A speech at the 45<sup>th</sup> SEACEN Governors’ Conference 26-27 February 2010

<sup>14</sup> Basel Committee on Bank Supervision, “Basel III: A global regulatory framework for more resilient banks and banking system”, Bank for International Settlement, December 2010

When the whole Basel III package is implemented, banks' common equity will need to be at least 7% of risk weighted assets. This compares to a Basel II level of 2% common equity—that is before taking account of the changes to definitions and risk weights, which make the effective increase in capital all the greater. The 7% figure includes a 2.5% capital conservation buffer.

Capital Requirements and Buffers

(%)

	<b>Common equity</b>	<b>Tier 1 capital</b>	<b>Total capital</b>
Minimum (A)	4.5	6.0	8.0
Conservation Buffer (B)	2.5		
A+B	7.0	8.5	10.5
Countercyclical Buffer	0.0~2.5		

**1-5 Improving the risk coverage of the regulatory capital framework**

The BCBS has improved the risk coverage of the regulatory capital framework for capital market activity. Specifically, capital requirements are raised for stocks, bonds and other trading book items, as well as for asset-backed securities, and differentiated risk assessments should be conducted on not only different products, but different counterparty risks. Also, trading activities should be subject to a stressed value-at-risk (VaR) requirement. In addition, Basel III creates incentives for banks to use CCPs in their derivatives trading.

These additional capital charges have been already implemented effective from the end of 2010. This reflected the BCBS's judgment that any postponement would not be justified, given the risks posed by the vulnerability on banks' balance sheets.

**1-6 Impact of the new requirements and implementation**

It is true that the Basel III will reduce the risk of a costly financial crisis and stabilizes the financial environment for long-term business decisions. Nevertheless, it is also true that the process of implementing the new regulatory framework will impose some costs on banking institutions and their customers as the institutions adjust their balance sheets and business models.

Against this background, the BCBS conducted a comprehensive quantitative impact study (QIS), in an attempt to assess the impact of the new requirements and corresponding adjustment. In particular, the Financial Stability Board and the Basel Committee assembled the Macroeconomic Assessment Group (MAG) to examine potential transitional impacts of Basel III on lending and

investment<sup>15</sup>. The MAG concluded that the transitional effects were likely to be modest. Specifically, the MAG estimated that bringing the global common equity capital ratio to a level that would meet agreed targets over 8 years would result in a maximum decline in average annual growth of GDP 0.03 percentage points relative to baseline forecast during 35 quarters, after which the growth rate would return back to towards the baseline. Also, the group found that implementing the reforms over 4 years rather than 8 years would lead to a slightly greater decline in the average annual growth rate of GDP over a short period, followed by a return towards baseline.

In addition, a subgroup of the Basel Committee, the long-term economic impact group (LEI group), conducted studies on the long-term economic impact of the reform, comparing costs with benefits. Based on these studies, the LEI group concluded that the long-term benefits of stronger capital and liquidity requirements substantially exceed the costs of the reform.

Based on these studies, the BCBS made it clear that the new standards would be introduced in a manner that does not impede the economic recovery. Consequently, the Committee chose a staggered timeline for implementation. Specifically, the Basel III requirements are due to take effect from the beginning of 2013 and will be phased in by 2019. This time frame includes an observation period to review the implication of the liquidity standards for individual banks, the banking sector and financial markets in order to address any unintended consequences. In addition, the BCBS will assess the impact of the leverage ratio during the transition period with a view to making sure that it achieves its intended objectives.

## **2. Addressing moral hazard posed by SIFIs**

Although the strengthening of capital and liquidity that will take place under Basel III is an important and necessary part of the regulatory agenda, it is not sufficient to address the negative externalities posed by SIFIs. The recent financial crisis demonstrated that some financial institutions had grown so large, leveraged, and interconnected that their failure could pose a threat to overall financial stability. In particular, creditors who believe that an institution will be regarded by the government as too big to fail may not price into their extension of credit the full risk assumed by the institution. The lack of market discipline allowed them to borrow at preferential rates, operate with higher levels of leverage, and engage in riskier activities. At the same time, the management and shareholder of these institutions may regard themselves as holding a kind of put option and may be motivated to take greater risks with the cheaper funds available to them. If the risky projects pay off, the shareholders profit. If the results are bad, the government may keep the institution afloat, thereby preserving at least some value for shareholders.

The sudden collapses of SIFIs turned out to be among the most destabilizing events of the crisis, as evidenced by the collapse of the Lehman Brothers in September 2008. In addition, with

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<sup>15</sup> Bank for International Settlement, BIS 81<sup>st</sup> Annual Report, Bank for International Settlement, Basel, Switzerland, June 2011

lenders increasingly reluctant to extend credit in the wake of lost confidence on the financial system, liquidity-strained institutions made increasingly distressed asset sales, which placed additional downward pressure on asset prices, leading to margin calls for all collateral providers. Consequently, as the result of the perceived severe impact on the financial system and the economy associated with their disorderly failure, many governments had no other option but to rescue these institutions from failure with taxpayers' money, including capital injection, deposit guarantees, etc. During this rescue process, however, losses were limited to their shareholders, while most of their creditors were protected. These bail-outs were based on policy judgments that failures of SIFIs would pose a risk that the entire financial system could be collapsed. However, these actions taken by governments helped to solidify the market view that such financial institutions were too systemically important to fail, raising concerns about moral hazard risk. In other words, once a government rescues these institutions, moral hazard problems are compounded, as market participants may expect similarly situated institutions to be rescued in the future.

Realizing seriousness of potential negative externalities posed by SIFIs, the G20 Leaders requested the Financial Stability Board (FSB) and the BCBS to develop a regulatory framework to address the SIFI problem. Despite the rationale for developing a regulatory framework for SIFIs with the strong endorsement of the G20 Leaders, there were some concerns among policymakers on the effectiveness of the regulations tackling moral hazard risk posed by SIFIs.

The first official discussions on the SIFI regulation among the G20 officials were taken place at the G20 workshop hosted by Korea in November 2009<sup>16</sup>. At the workshop, there were skeptics and advocates on the effectiveness of regulating SIFIs. Skeptics argued that regulating SIFIs would be ineffective based on the following two reasons. First, they argued that the designation of certain financial institutions as SIFIs by regulatory authorities itself could provide implicit government guarantees that they could be bailed out when they failed, thereby creating the scope for their moral hazard s. This, in turn, might make almost impossible to prevent the so-called "too-big-to-fail subsidy" in funding costs of SIFIs. In fact, an empirical study by the staff of the Federal Reserve Bank of New York<sup>17</sup> found that the naming of eleven banks as "too big to fail" in 1984 led bond raters to raise their ratings on new bond issues of these banks about a notch relative to those of other unnamed banks. Furthermore, the study suggested that investors were even more optimistic than raters about the probability of support for those banks. Second, skeptics argued that although any effective approach to address the SIFI problem needed to have effective resolution at its base, it might be almost impossible to resolve SIFIs in an orderly manner, due mainly to a multinational aspect of most SIFIs' business activities. This argument reflected the inconvenient truth that financial institutions may be global in

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<sup>16</sup> "Securing Sustainable Recovery", the G20 workshop hosted by the Korean government, held in Seoul, Korea on 15-16 November 2009.

<sup>17</sup> Morgan, Donald P. and Kevin J. Stiroh, "Too Big to Fail after All These Years," Staff Report, Federal Reserve Bank of New York, September 2005

life but are national in death.

But the advocates suggested the following reasons to support the case for regulating SIFIs. First, they thought that naming SIFIs would make little difference since market participants already knew the list of potential SIFIs. Second, they argued that a sufficiently large surcharge would reduce the probability of a bail-out by strengthening the financial institutions, mitigating negative externalities posed by SIFIs. Third, they believed that it would be possible to encourage SIFIs to become simpler and smaller, if the special charge for SIFIs were set high enough to offset the subsidized borrowing costs that come with SIFIs' implicit government guarantees. Fourth, although there were some truths about the complexity of resolving internationally active financial institutions in an orderly manner, they argued, it could be possible to resolve internationally active SIFIs without causing significant disruption to wider financial system by introducing comprehensive resolution regimes and tools, and improving cross-border coordination mechanisms.

Despite the practical difficulties associated with developing an effective regulatory framework to reduce the moral hazard risk posed by SIFIs, the G20 was determined to make sure that no financial institution is "too-big-to-fail" or "too-important-to-fail" and taxpayers do not bear the costs of resolution of any financial institution that does fail. To this end, the regulatory framework for SIFIs being developed by the FSB comprises four main components: identification of SIFIs, greater loss absorbency capacity, making resolution as a viable option, more intense supervision, and strengthening core financial market infrastructures.

More specifically, the FSB report on SIFIs<sup>18</sup>, which was endorsed by the G20 Leader at the Seoul Summit, specified the policy framework for SIFIs should include the following elements. The first one is a resolution framework and other measures to ensure that all financial institutions can be resolved safely, quickly and without causing a major disruption in the financial system and exposing the taxpayers to the risk of loss. The second one is a requirement that SIFIs have higher loss absorbency capacity to reflect the greater risks that these institutions pose to the global financial system. The third one is more intensive and intrusive supervisory oversight for SIFIs. The fourth one is robust core financial market infrastructures to reduce contagion risk from the failure of individual institutions, the final one is other supplementary prudential and other requirements as determined by the national authorities.

## **2-1. Identifying SIFIs**

SIFIs are firms whose disorderly failure, because of their size, interconnectedness, substitutability, concentration and common exposure, would cause significant disruption to the entire financial system and the economic activity. Size refers the volume of financial services provided by the individual institution of the financial system. Interconnectedness describes a situation where

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<sup>18</sup> Financial Stability Board, J. Stiroh, "Too Big to Fail after All These Years," Staff International Settlement, December 2

distress at one institution raises the likelihood of distress at others. Substitutability means the extent to which other institutions of the system can provide the same services in the event of a failure of a certain institution. Concentration describes a situation that some financial systems or market segments feature a few large players that dominate a market for financial services where there are few alternatives. Common exposure refers that financial institutions may hold similar positions to their peers, suggesting that a common shock could cause distress at multiple institutions simultaneously.

In order to mitigate moral hazard risk and negative externalities associated with SIFIs, a logical starting point is to identify SIFIs. SIFIs are divided into two groups. One is global SIFIs (G-SIFIs) which are systemically important not only in its home country but also in the world. The other is domestic SIFIs (D-SIFI) that are only systemically important in its home country's perspective. In the proposed SIFI framework, G-SIFIs are to be designated by FSB and D-SIFIs are to be designated by each country's own regulatory authorities.

The Macro-prudential Supervision Group (MPG) under the BCBS developed an assessment methodology comprising both quantitative and qualitative indicators to assess the systemic importance of global systemically important banks (G-SIBs). The assessment methodology is an indicator-based designed to assess the likely impact of the failure of a bank on the global financial system and wider economy. Specifically, in this methodology, potential SIBs are rated against indicators reflecting size, interconnectedness, availability of substitutes, cross-jurisdiction activity, and complexity.

Based on this methodology, the FSB released a list of 29 G-SIBs on 4 November 2011. The initial list included 17 banks from Europe, 8 banks from the US, and 4 banks from Asia. The list will be updated by the FSB each year in November. Also, the G20 asked International Association of Insurance Supervisors (IAIS), Committee on Payment and Settlement System (CPSS), International Organization of Securities Commissions (IOSCO) and the FSB in consultation with IOSCO to prepare methodologies for assessing G-SIFI status for non-bank financial institutions by end-2012. In this regard, the IAIS completed its assessment methodology for identifying globally systemically important insurers in June 2012.

## **2-2. Greater loss absorbency capacity**

Based on the policy framework for SIFIs suggested by the FSB in 2010 that G-SIBs should have higher loss-absorbing capacity to reflect the greater risks posed by them, G-SIBs face additional capital requirements to increase their going concern loss absorbency. The rationale for adopting additional measures, including higher loss absorption capacity for G-SIBs, is based on the negative cross-border externalities they create. The additional capital must be met with common equity Tier 1 capital. The BCBS decided that the additional capital would range from 1% to 2.5% of risk-weighted assets, depending on a G-SIB's systemic importance. Specifically, G-SIBs will be allocated to four "buckets" requiring levels of additional capital from 1.0% to 2.5%. "Bucket 5", requiring 3.5% additional capital, will initially be empty to provide an incentive for G-SIBs not to become bigger or

more complex. Also, the published list of G-SIB will show the allocations to buckets for each institution from November 2012.

The additional capital will be treated as an extension of the capital conservation buffer put in place in Basel III. Thus, if a G-SIB breaches the additional capital requirement, it will face restrictions on distributions and will have to agree a capital remediation plan with its supervisor.

The requirement will be phased in parallel with the Basel III capital conservation buffer and countercyclical buffers. Specifically, the requirement will commence on 1 January 2016 and be fully in place from 1 January 2019.

### **2-3. Making resolution a viable option**

Since the most obvious solution for moral hazard posed by SIFIs is to make sure that no institution is deemed to be either too big or interconnected to fail, another critical element of the G20's effort to address SIFIs is to develop effective tools and a framework for resolution of large complex cross-border financial institutions. The recent crisis clearly demonstrated that the scope, scale and complexity of international financial transactions expanded remarkably, while the tools and techniques for handling resolution of cross-border financial institutions did not evolve. In fact, many complex economic and legal issues are involved in the bankruptcy of a large complex cross-border financial institution. Moreover, if a jurisdiction establishes legal frameworks that strengthen the protection of its people's rights in resolving cross-border financial institutions, this may bring about much international conflict and cause severe financial market disruptions.

To handle this problem, the FSB released a new internationally-agreed standard that sets out the responsibilities, instruments and powers that national resolution regimes should have to resolve a failing SIFI, "Key Attributes of Effective Resolution Regimes for Financial Institutions"<sup>19</sup>, on 4 November 2011. The key Attributes will help address the "too-big-to-fail" problem by making it possible to resolve any financial institution in an orderly manner and without exposing the taxpayer to the risk of loss, protecting vital economic functions through mechanisms for losses to be shared between shareholders and unsecured and uninsured creditors.

More specifically, first, the Key Attributes require jurisdictions to have a designated resolution authority that has a broad range of power to intervene and resolve a financial institution that is no longer viable, including through transfers of business and creditor-financed recapitalization. Second, for internationally active firms, the Key Attributes set out a framework to remove impediments to cross-border cooperation and provide resolution authorities with incentives, statutory mandates and powers to share information across borders and achieve a coordinated solution that takes into account financial stability in all jurisdictions affected by a financial institution's failure. Third, the Key Attributes requires jurisdictions to make sure that recovery and resolution plans are put in place for all

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<sup>19</sup> Financial Stability Board, "Key Attributes of Effective Resolution Regimes for Financial Institutions", October 2011

G-SIFIs under the control of top officials, and informed by rigorous annual resolvability assessments that assess the feasibility and credibility of resolution strategies for each G-SIFI. Finally, jurisdictions are required to maintain Crisis Management Groups for all G-SIFIs, bringing together home and key host authorities and underpinned by institution-specific cross-border cooperation agreement.

The G20 and the FSB called on countries to undertake the reforms necessary to implement this standard. Effective implementation of the Key Attributes will require substantial follow-up work by national authorities, standard setting bodies and individual firms. Legislative changes will be required in many jurisdictions to ensure that the national resolution confers all the necessary powers on national authorities. Financial institutions and authorities will also need to develop Recovery and Resolution Plans (RRPs), which include details on credible options for reversing financial deterioration or resolving failed firms.

In this context, G-SIBs are required to have a RRP, which will provide a strategic roadmap for authorities to unwind them, in place by end-2012. Each G-SIB will have a Crisis Management Group (CMG) comprising the home regulatory authority and key host authorities. A board level representative of the banking firm must keep the RRP up-to-date and coordinate its annual review and resolvability assessment by the firm's CMG under its cross-border cooperation agreement. Institution-specific cross-border cooperation agreements must be put in place by authorities by end-2012.

#### **2-4. Improving the intensity and effectiveness of SIFI supervision**

Increasing the intensity and effectiveness of supervision is another key element of the G20's framework for SIFIs. In this context, many countries are seeking to intensify their supervisions of SIFIs by improving their supervisory tools and methods to enable supervisors to focus on key area of risk and to identify underlying weaknesses in firm's risk management practices. In addition, efforts to implement the new regulatory framework need to be supported by strong supervision of individual institutions.

To this end, the FSB called on supervisors to be held to higher standards. The BCBS reviewed and revised the "Basel Core Principles for Effective Banking Supervision".

The crisis also illustrated the shortcomings in cross-border supervisory relationship. The shortcomings are addressed through the strengthening of supervisory college functioning and the establishment of crisis management groups. Since supervisory colleges are an important tool, the BCBS and IAIS continue to study and improve their effectiveness.

#### **2-5. Extending the SIFI framework**

At the Cannes Summit, the G20 Leaders asked the FSB in consultation with the BCBS to extend the G-SIB framework to domestic systemically important banks (D-SIBs). Also, the IAIS was asked with the development of assessment methodology for the identification of global systemically important insurers (G-SIIs) and to continue its work on a common framework for the supervision of



internationally active insurance groups. In addition, the G20 Leaders requested the FSB in consultation with IOSCO to prepare methodologies to identify global systemically important non-bank financial entities by end-2012.

The FSB submitted to the G20 Finance Ministers and Central Bank Governors in April 2012 a progress report on the modalities to extend the G-SIB framework to D-SIBs. The report suggested that the policy framework for D-SIB would take the perspective of individual jurisdictions and that the D-SIB framework being considered would be based on assessments by local authorities, who were best-placed to identify D-SIBs in their own jurisdictions.

Nevertheless, the D-SIB framework should be compatible with G-SIB framework, with respect to ensuring that adequate and consistent incentive structures are in place at the domestic as well as the global level. The principles for D-SIBs being considered therefore seek to establish a minimum framework, address the cross-border externalities that the failure of a D-SIB may pose, and preserve a level playing field within and across jurisdictions. Also, the principles would include guidelines for national authorities to assess the systemic importance of banks in a domestic context.

Currently, the BCBS is developing a set of principles as a common framework for D-SIBs. The principles include on the issue of compatibility with the G-SIB framework, home-host country coordination, and the instruments and composition of additional loss absorbency for D-SIBs. The FSB and BCBS will report the outcome of this work to the G20 Finance Ministers and Central Bank Governors meeting in November 2012.

Regarding G-SIIs, the IAIS has made progress in developing an assessment methodology for identifying them. The IAIS issued a consultation paper on this. The paper also included some initial thoughts on potential policy measures that should apply to G-SIIs including enhanced supervision, improved resolvability, structural measures higher loss absorbency and restrictions on certain activities. The IAIS will deliver to the G20 in April 2013 a consolidated paper on the assessment methodology and the policy measure. At that time, the FSB, in consultation with the IAIS, will determine the initial list of G-SIIs.

In response to the request of the G20 Leaders, the FSB, in consultation with the IOSCO, is preparing methodologies for identifying non-bank G-SIFIs. In developing the methodologies, the FSB will focus on detailed design issues such as the scope of application, applicability of materiality criteria, methods of operations and data availability.

## **2-6. Strengthening core financial market infrastructures**

The robustness of the infrastructure underpinning financial transactions is central to containing contagion in the event of SIFI failure. Consequently, the way market infrastructures are designed and how they function has important implications for financial stability because they can act as a channel through which disruptions can spread among financial market participants.

With regards to strengthening financial market infrastructures (FMIs), the CPSS and IOSCO

finalized international standards for core financial market infrastructure and published their final report, "Principles for Financial Market Infrastructures", in April 2012. The report updates, harmonizes, and strengthens the risk management and related standards applicable to FMIs, including systemically important payment systems, central securities depositories, securities settlement systems, central counterparties, and trade repositories. The report replaces the CPSS and IOSCO's previous standards for systemically important payment systems, central securities depositories, securities settlement systems (SSSs), central counterparties (CCPs) and trade repositories.

The new standards are designed to make FMIs more resilient to financial crises and, in particular, participant defaults. The report also includes revised responsibilities of relevant authorities in regulating, supervising and overseeing FMIs. CPSS and IOSCO members will strive to adopt the new standards by end-2012 and put them into effect as soon as possible. Also, CPSS and IOSCO have started work on resolution of FMIs and will work with the FSB to develop sector-specific guidance for the application of the FSB Key Attributes resolution framework to these FMIs.

### **3. Strengthening the oversight and regulation of shadow banking**

Another critical element of the reform agenda is to monitor and address the risks that may come from the shadow banking system. Shadow banking refers to "credit intermediation involving entities and activities outside the regular banking system"<sup>20</sup>. Shadow banking includes: the activities of money market funds; lending by unregulated finance companies; the issuance by specialized conduit and investment vehicles of commercial paper backed by long-term assets; and the funding of securitization activities through repo markets. However, the shadow banking system is closely intertwined with the regulated system. Large banks typically draw substantial income from shadow banking activities and retain both direct and indirect credit and operational exposures, backup liquidity lines, brokerage services, warehousing and credit insurance. Shadow banking can perform valuable functions, including facilitating credit extension to certain sectors and providing banks and investors with a range of vehicles for managing credit, liquidity and maturity risk.

However, the recent financial crisis illustrated that shadow banking can contribute to systemic risk, both directly and through its interconnectedness with the regular banking system. It can also create opportunities for regulatory arbitrage that might undermine stricter bank regulation and lead to a build-up of additional leverage and risks in the financial system.

In this regard, following the completion of the Basel III framework, the G20 Leaders called for work to address the potential that strengthened banking regulation would widen regulatory gaps vis-à-vis the shadow banking system at the Seoul Summit. They requested the FSB to develop a framework to strengthen the regulation and oversight of the shadow banking system. In response to this request, the FSB formed a task force to clarify the exact definition of the shadow banking and its

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<sup>20</sup> Financial Stability Board, "Shadow Banking: Scoping the Issues", A Background Note of the Financial Stability Board, April 2011

role and risks; to set out approaches for effective monitoring of it; and to prepare additional regulatory measures to address the systemic risk and concerns about regulatory arbitrage that it poses.

In April 2011, the FSB published a background note<sup>21</sup> to address such risks posed by the shadow banking system. It defined the shadow banking system on the basis of a practical two-step approach by first casting the net wide to all non-bank credit intermediation for monitoring purpose and then narrowing the focus for policy purposes to a subset where systemic risk and concerns about regulatory arbitrage are relevant.

Subsequently, the FSB set out initial recommendations in its October 2011 report<sup>22</sup> to address such risks posed by the shadow banking system. At the Cannes Summit in November 2011, the G20 Leaders endorsed the FSB's initial recommendations with a work plan to further develop them in the course of 2012.

The FSB's initial recommendations adopted a two-pronged approach. First, the FSB will enhance the monitoring framework through continuing its annual monitoring exercise to assess global trends and risks, with more jurisdictions participating in the exercise. Second, the FSB will develop recommendations to strengthen the regulation of the shadow banking system to mitigate the potential systemic risk with specific focus on the following five areas. The five areas include: to mitigate the spill-over effect between the regular banking system and the shadow banking system; to reduce the susceptibility of money market funds to runs; to assess and mitigate systemic risks posed by other shadow banking entities; to assess and align the incentives associated with securitization to prevent a repeat of the creation of excessive leverage in the financial system; and to dampen risks and pro-cyclical incentives associated with secured financing contracts such as repos and securities lending.

### **3-1. Strengthening oversight of the shadow banking system**

The FSB set out recommendation for effective monitoring of shadow banking in its October 2011 report. The recommendations consist of seven high-level principles and a stylized three-step monitoring process. The seven high-level principles specifies essential principles concerning scope, process, data and information, innovation and mutation, regulatory arbitrage, jurisdiction-specific features, and information exchange in developing an effective monitoring framework. At the same time, the FSB recommends authorities to put in place an appropriate monitoring system in line with the stylized three-steps which consist of: scanning and mapping of the overall shadow banking system (step 1); identification of the aspects of the shadow banking system posing systemic risk or regulatory arbitrage concerns (step 2); and detailed assessment systemic risk and/or regulatory arbitrage concerns (step 3).

In addition, the FSB has committed to conduct annual monitoring exercises to assess global

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<sup>21</sup> Financial Stability Board, "Shadow Banking: Scoping the Issues", A Background Note of the Financial Stability Board, April 2011

<sup>22</sup> Financial Stability Board, "Shadow Banking: Strengthening Oversight and Regulation", 27 October 2011

trends and risks in the shadow banking system. The global monitoring exercise conducted in 2011 covered eleven FSB member jurisdictions and the euro area. The coverage of the 2012 monitoring exercise will be extended to cover the remaining FSB jurisdictions. The annual monitoring is expected to facilitate the national authorities' assessment of shadow banking risks based on the FSB recommendations, and the sharing of experiences among authorities in order to highlight trends in shadow banking that are relevance to the stability of the global financial system.

### **3-2. Strengthening regulation of the shadow banking system**

Based on the FSB's initial recommendations, five work streams have been established to develop policy recommendations in the following five areas. They are: banks' interactions with shadow banking entities; money market funds (MMFs); other shadow banking entities; securitization; and securities lending and repos.

First, the BCBS was tasked to develop policy recommendations to regulate banks' interaction with shadow banking entities. It reviews the consolidation rules for prudential purposes; limits on the size and nature of a bank's exposures to shadow banking entities; risk-based capital requirements of banks' exposures to shadow banking entities; and the treatment of reputational risk and implicit support.

Second, the IOSCO was responsible for developing policy recommendations to reduce the susceptibility of MMFs to runs. The possible policy options include: a mandatory move from constant to variable net asset value; enhancement of liquidity risk management; and reduction in the importance of ratings in the MMF industry.

Third, an FSB work stream is developing policy recommendations on the regulation of shadow banking entities other than MMF to mitigate their systemic risks. The work stream completed a categorization and data collection exercise for a wide range of non-bank financial institutions. The work stream is adopting a two-step prioritization process to narrow the scope to certain types of entities that may need policy responses. The first step is to develop a list of entity types for closer scrutiny based on national experience and size. The second step is to conduct the detailed assessment of the shadow banking risk factors such as maturity transformation, liquidity transformation and leverage with respect to each entity type in the list and develop policy recommendations.

Fourth, IOSCO was tasked to assess and align the incentives associated with securitization in an attempt to prevent excessive leverage created by securitization. Specifically, this work stream is examining the retention requirements and measures that are aimed at enhancing transparency and standardization related to securitization.

Finally, an FSB work stream is examining the regulation of secured financing contracts such as repos and securities lending in the context of financial stability. The financial stability issues identified by the work stream include: lack of transparency; pro-cyclicality of system leverage and interconnectedness through valuation, haircuts and collateral re-use; other issues associated with re-

use of collaterals; potential risks arising from fire-sale of collateral assets; potential risks arising from securities lending activities; shadow banking through cash collateral reinvestment; and insufficient rigor in collateral management and valuation. Based on its identification of financial stability issues, the work stream will develop policy recommendations.

#### **4. OTC derivatives reforms**

Over-the-counter (OTC) derivatives benefit financial markets and the wider economy by improving the pricing of risk, adding to liquidity and helping market participants manage their risks. Markets in certain OTC derivatives continued to function well throughout the recent financial crisis. Nevertheless, the financial crisis revealed weaknesses in OTC markets that had contributed to the build-up of systemic risk. These weaknesses included the build-up of large counterparty exposures between particular market participants which did not manage risk appropriately; contagion risk arising from the interconnectedness of OTC derivatives market participants; and the limited transparency of overall counterparty credit risk exposures that precipitated a loss of confidence and market liquidity in time of stress.

To address these weaknesses, at the Pittsburg Summit in September 2009, the G20 Leaders called for reforms in OTC derivatives markets. Specifically, the Leaders agreed that all standardized OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties (CCPs) by end-2012 at the latest; OTC derivative contracts should be reported to trade repositories (TRs); and non-centrally cleared contracts should be subject to higher capital requirements<sup>23</sup>.

The basic ideas behind the Leaders' commitments make great sense to address the weaknesses in OTC market. First, standardization is a key condition for central clearing and trading on exchange or electronic trading platforms, and also helps to facilitate greater market transparency. Second, the shift of OTC derivatives to central clearing would make significant progress toward mitigating systemic risk by improving counterparty credit risk management, allowing multilateral netting, reducing uncertainty about participants' exposures, and increasing transparency of market activity. CCPs, in particular, mutualize the risk of counterparty failure through use of pre-funded default and guaranty funds and manage counterparty credit risk centrally. Third, TRs can conduct an important function as credible source of data on OTC derivatives transactions for authorities, market participants and the public, by centralizing the collection, storage and dissemination of information in a consistent manner.

In response, the FSB published a report, "Implementing OTC Derivatives Markets Reforms", in October 2010 that set out twenty one recommendations to address practical issues in implementing the G20 Leaders' commitments. Subsequently, the FSB published its progress report on the

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<sup>23</sup> Leaders' Statement: The Pittsburgh Summit, September 24-25

implementation of OTC derivatives reform in October 2011. The report urged that all jurisdictions and markets need to push aggressively push ahead to achieve full implementation of market changes by end-2012 to meet the G20 Leaders' commitments.

Since the October 2011 progress report, standard-setting bodies (SSBs) have made significant progress in developing specific principles and recommendations for the implementation of the OTC market reform. CPSS and IOSCO issued a report, "Principles for Financial Market Infrastructures", in April 2012. These principles are important milestone in the global development of a sound basis for central clearing of all standardized OTC derivatives. IOSCO published its "Report on Requirements for Mandatory Clearing" in February 2012, providing important guidance for jurisdictions on the process for setting the scope of central clearing requirements. In January 2012, CPSS and IOSCO issued a "Report on OTC Derivatives Data Reporting and Aggregation Requirements", recommending that trade repositories implement measure to provide authorities with effective and practical access. IOSCO published its "Final Report on International Standards for Derivatives Market Intermediary Regulation" in June 2012. This report recommended high-level international standards for the regulation of market participants that are in the business of dealing, making a market or intermediating transactions in OTC derivatives.

In addition, the FSB identified four safeguards for a resilient and efficient environment for central clearing in January 2012. The safeguards include: fair and open access by market participants to CCPs, based on transparent and objective criteria; cooperative oversight arrangements between all relevant authorities; resolution and recovery regimes that ensure the core functions of CCPs are maintained during times of crisis and that consider the interests of all jurisdictions where the CCP is systemically important; and appropriate liquidity arrangement for CCPs in the currencies in which they clear.

## **5. Strengthening and converging accounting standards**

During the recent financial crisis, the fair value accounting model for financial assets and the current system of loan-loss provisioning based on incurred losses increased pro-cyclicality, to a certain extent. At the same time, the complicated accounting standards of different countries reduced financial market transparency.

At the Cannes Summit in November 2011, the G20 Leaders reaffirmed their objective to achieve a single set of high quality global accounting standards and meet the objectives set at the London Summit in April 2009. The Leaders called on the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) to complete their convergence project and requested a progress report on this issue at the G20 Finance Ministers and Central Bank Governors meeting in April 2012.

In response to the Leaders' request, a joint update report from the IASB and FASB was submitted to the G20 Finance Ministers and Central Bank Governors in April 2012. According to the

report, important improvements to their standards on financial institutions' fair value and off-balance sheet entities were finalized in 2011. However, the report indicated that the convergence process was taking longer than initially expected in some areas, including classification, measurement and provisioning. The IASB and FASB reported that they were making progress on projects to converge their standards on financial instruments, including a joint expected impairment provisioning approach and a more converged approach to classification and measurement. The IASB and FASB plan to conduct further public consultation in the second half of 2012 and are expected to issue final converged standards in number of key areas by mid-2013. The two Boards have extended certain project target completion dates in order to allow sufficient time for extensive outreach and public comment on the large number of planned major Exposure Drafts, and for the Boards to reflect that feedback in high-quality final standards.

## **6. Reducing reliance on credit rating agencies' ratings**

The recent financial crisis clearly illustrated that the inadequate risk assessments by credit rating agencies (CRAs), and investors' mechanical reliance on their credit rating amplified pro-cyclicality. At the same time, investors' over-reliance on CRA ratings contributed to systemic disruption through herding behavior and sell-offs of securities when they are abruptly downgraded, so-called "cliff effects".

To address the inadequate risk assessment by CRAs, national and regional initiatives are ongoing to strengthen oversight of credit rating agencies (CRAs), based upon the IOSCO CRA Code of Conduct Fundamentals. In particular, the IOSCO Task force on CRA published the results of its work reviewing CRA implementation the IOSCO CRA Code in March 2009. The report found that a larger proportion of the CRAs reviewed were aware of the IOSCO CRA code and took steps to incorporate its provisions into their codes of conduct. Also, the IOSCO announced that the Task Force would be converted into a permanent standing committee of IOSCO's Technical Committee to review and update the international consensus regarding CRA oversight.

In October 2010, the FSB published a set of principles for reducing mechanical reliance on CRA ratings<sup>24</sup> and requested SSBs and regulators to consider next steps to translate the principles into more specific policy actions. In essence, the FSB Principles aim to encourage banks, institutional investors and other market participants to develop their own internal risk management capabilities to avoid mechanical reliance on external credit ratings. The Principles emphasized that CRA ratings should be no more than an input to the risk assessment process.

In this context, the FSB conducted a review of its members' compliance with the FSB Principles. The review found that a few jurisdictions passed, or proposed, wide-ranging legislative or regulatory measures to reduce reliance on CRA ratings, but were facing difficulties in detailed implementation. Consequently, the report called for clear milestones to be set out for the transition to a

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<sup>24</sup> Financial Stability Board, "Principles for Reducing Reliance on CRA Ratings", 27 October 2010

reduced reliance on CRA ratings over the medium term. Specifically, the report recommended the steps including: further actions by regulators to encourage the appropriate use of CRA rating as an input to the risk assessment process; and setting standards that actively promote the use of market participants' own risk capabilities. In addition, the report underlined that SSBs should promote the sharing of successful practices to strengthen credit risk capabilities and official sector bodies should publicly explain their approach to credit risk assessment in their market and investment operations.

To encourage further progress on these issues, the FSB will organize a workshop in September 2012 that will bring together SSBs and national experts to review the progress and agree on the next steps. The output from the workshop will be incorporated in a further progress report for the G20 Finance Ministers and Central Bank Governors meeting in November 2012.

## **7. Enhancing compensation practices**

.Compensation practices at large financial institutions were a key contributing factor to the recent financial crisis. Asymmetries in remuneration systems in terms of risk and reward led to short-termism and excessive risk-taking. High short-term profits led to generous bonus payments to employees without adequate regard to the longer-term risks they imposed on their firms. These perverse incentives amplified the excessive risk-taking that severely threatened the global financial system. The lack of attention to risk also contributed to the large, in some cases extreme absolute level of compensation industry, leaving firms with less capacity to absorb losses as risks materialized. To safeguard financial stability, remuneration system in the financial sector must be better aligned to long-term value creation as well as prudent risk-taking.

Against this backdrop, the Financial Stability Forum, the predecessor of the FSB, issued "Principles for Sound Compensation Practices and their Implementation Standards in April 2009. The FSB Principles and Standards Sound Compensation Practices were endorsed by the G20 leaders at their Summits in London in April 2009 and Pittsburgh in September 2009. The principles include: (1) avoiding multi-year guaranteed bonuses; (2) requiring a significant portion of variable compensation to be deferred, tied to performance and subject to appropriate claw-back and to be vested in the form of stock or stock-like instruments, as long as these create incentives aligned with long-term value creation and the time horizon of risk; (3) ensuring that compensation for senior executives and other employees having a material impact on the firm's risk exposure align with performance and risk; (4) making firms' compensation policies and structures transparent through disclosure requirements; (5) limiting variable compensation as a percentage of total net revenues when it is inconsistent with the maintenance of a sound capital base; and (6) ensuring that compensation committees overseeing compensation policies are able to act independently.

In March 2010, the FSB released the findings and conclusions of the peer review of implementation of the FSB Principles and Standards. In its "Thematic Review on Compensation: Peer Review Report" the FSB noted that the Principles and Standards are well reflected in the regulatory



and supervisory frameworks of member jurisdictions<sup>25</sup>. It also added some recommendations,<sup>26</sup> however, and urged member countries to work toward complete adherence.

The 2011 FSB peer review on compensation, which was released in October 2011, indicated that good progress had been made in implementing the FSB Principles and Standards on Sound Compensation Practice. However, the report urged that more work was necessary to overcome constraints to full implementation by individual national authorities and to address concerns by firms of an unequal playing field.

In April 2012, in response to G20 Leaders' request, the FSB established Compensation Monitoring Contact Group (CMCG) comprising national experts from member jurisdictions with regulatory or supervisory responsibility on compensation practices. The CMCG is responsible for monitoring and reporting to the FSB on national implementation of the FSB Principles and Standards on Sound Compensation Practice.

The progress report sent to G20 Leaders in June 2012<sup>27</sup> was the first outcome of this monitoring exercise. The report noted that almost all FSB member jurisdictions have now completed the implementation of the FSB Principles and Standards in their national regulation or supervisory guidance. By indicating that there remain important differences in terms of applying the FSB Principles and Standards, the report confirmed the 2011 peer review's conclusion that achieving lasting change in behavior and culture within firms is a long-term challenge requiring a sustained commitment and that additional time is needed for a common supervisory understanding to evolve and for effective and consistent implementation of the FSB Principles and Standards to take place.

## **8. Other issues**

### **8-1. Building a common legal entity identifier**

At the Cannes Summit, the G20 Leaders supported the creation of global legal entity identifier (LEI) which uniquely identifies parties to financial transactions. The Leaders asked the FSB to take the lead in helping coordinate work among the regulatory community to prepare recommendations for a governance framework for global LEI that is consistent with the public interest.

The global LEI system would contribute to and facilitate many financial stability objectives. They include: improving risk management and mitigating operational risks in individual firms; better assessment of micro and macro-prudential risks; facilitation of orderly resolution; containing market abuse and curbing financial fraud; and enabling higher quality and accuracy of financial data overall.

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<sup>25</sup> 16 out of 24 countries have reflected the FSB Principles and Standards in their regulatory and/or supervisory approaches, and four countries are planning to reflect them shortly.

<sup>26</sup> Thematic Review on Compensation: List of Recommendations

<sup>27</sup> Financial Stability Board, Implementing the FSB Principles for Sound Compensation Practices and their Implementation Standard: Progress Report, 13 June 2012

The FSB prepared a report containing recommendations to implement a global LEI system<sup>28</sup> in June 2102. The report contains 35 recommendations for development and implementation of the global LEI system. These recommendations are guided by a set of “Global LEI System High Level Principles” which set out the objectives that the design of a global LEI system must meet. The broad goal of the proposals is to put in place a strong global governance framework to protect the public interest, while promoting an open, flexible, and adaptable operational model for the global LEI system. The FSB’s objective is to have a fully functioning self-standing governance and operational framework for the global LEI system by March 2013.

## **8-2. Enhancing market disclosure and functioning**

The financial markets are a potential transmission mechanism for systemic crisis. This is particularly the case when market participants are faced with significant uncertainty, and engage in panic behavior.

In this regard, the IOSCO has taken steps to strengthen market disclosure and enhance investor protection. The IOSCO published in February 2012 a consultation report on asset-backed securities<sup>29</sup> (ABSs) that provides guidance for securities regulators who are developing or reviewing their regulatory regimes for ongoing disclosure for ABSs so as to enhance investor protection. Also, the IOSCO published in February 2012 a consultation report on common principles concerning stability and disclosure standards for market intermediaries in relation to the distribution of complex financial products<sup>30</sup>. In addition, the IOSCO issued in March 2012 a consultation paper on exchange traded funds<sup>31</sup> (ETFs) which included some common principles and guidelines relating to ETFs on investor protection, sound functioning of markets and financial stability.

## **8-3. Building and implementing macro-prudential policy frameworks and tools**

Recently, policymakers have paid greater attention to build and implement macro-prudential policy frameworks. It is widely recognized after the recent financial crisis that focusing merely on the soundness of individual financial institutions is a necessary condition, but not a sufficient condition for financial stability.

The G20 Leaders stated at the Cannes Summit that they would develop macro-prudential policy frameworks and to limit the build-up of risks in the financial sector, building on the ongoing work of the FSB-BIS-IMF on this subject. While a small number of jurisdictions including UK, US

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<sup>28</sup> Financial Stability Board, “A Global Legal Entity Identifier for Financial Market”, 8 June 2012

<sup>29</sup> International Organization of Securities Commissions, “Principles for Ongoing Disclosure for Asset-Backed Securities”, Consultation Paper, February 2012

<sup>30</sup> International Organization of Securities Commissions, “Suitability Requirements with respect to the Distribution of Complex Financial Products”, Consultation Paper, February 2012

<sup>31</sup> International Organization of Securities Commissions, “Principles for the regulation of Exchange Traded Funds”, Consultation Paper, March 2012

and EU have established new institutional structures with macro-prudential mandates, many others are implementing enhancements within existing institutional arrangements.

The BCBS published in May 2012 two working papers arising from its Research Task Force Transmission Channel project that help to build the knowledge base in the area of macro-prudential policies. The first working paper<sup>32</sup> analyzes the link between the real economy and the financial sector, and channels through which the financial system may transmit instability to the real economy. The second working paper<sup>33</sup> focuses the methodological progress and modeling advancements aimed at improving financial stability monitoring and the identification of systemic risk potential.

#### **8-4. Non-cooperative jurisdictions**

Hedge fund transactions through tax havens and off-shore financial centers were also seen as a problem leading to the financial crisis. Insufficient prudential regulations and information led to limited detection and management of the risks imposed by hedge funds that set up paper companies in off-shore financial centers.

To protect the global financial system and prevent tax leakages, the G20 initiated discussions on Non-Cooperative Jurisdictions (NCJs) in the areas of exchange of information on taxation and Anti-Money Laundering/ Combating the Financing of Terrorism (AML/CFT).

At the G20 London Summit, leaders requested that the relevant institutions conduct peer review processes and assessments to ensure full compliance with global standards on taxation, anti-money laundering, and combating the financing of terrorism.

The OECD Global Forum will be conducting a three-year survey on jurisdictions to see whether they have implemented the internationally agreed tax standards, and will report its findings to the G20 meetings. The G20 initiated peer reviews of tax havens from March 2010, and will deliver its first report on this by the end of this year.

The Financial Action Task Force (FATF), through its public statement on Feb. 18, 2010, released the list of countries that pose serious risks to the global community due to their defective systems for AML/CFT.

### **III. Conclusion and Remaining Challenges**

It is fair to say that progress made on the ongoing G20 agenda for more resilient global financial system has been very comprehensive and impressive. Nevertheless, there remains more works to do in achieving the objectives of this agenda. In particular, we need to focus more on completing the regulatory frameworks as early as possible, implementing them in a globally consistent

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<sup>32</sup> Basel Committee on Banking Supervision, "The policy implications of transmission channels between the financial system and the real economy", BCBS Working Papers No 20, May 2012

<sup>33</sup> Basel Committee on Banking Supervision, "Models and tools for macro-prudential analysis", BCBS Working Papers No 21, May 2012

way, and ensuring adequate oversight.

As far as the completion of the regulatory framework is concerned, more efforts need to be focused on completing regulatory reform in some areas which show lack of progress. A notable example in this context might be the reform agenda concerning the strengthening and converging accounting standards. Other areas include developing effective regulations on non-bank SIFIs and shadow banking. If the reform process in these areas were to be further delayed, the associated regulatory uncertainty could jeopardize a recovery from the crisis and the potential for new risk to be emerged from these areas is very likely to be increased.

Regarding the implementation of the ongoing regulatory reform agenda, we need to keep in mind what history guides us. The ongoing regulatory reform process reminds us of a “regulatory dialectics”. After experiencing a period of financial sector regulation until the early 1980s, we subsequently witnessed a period of deregulation. Since the financial crisis, however, we are now entering a period of re-regulation. The question is whether this is the end of the process. The answer to this depends critically on the sustainability of the current regulatory reform, in this environment of globally integrated financial markets. In this regard, it is important to emphasize that regulatory arbitrage has played a key role to transform the process from regulation to deregulation. In fact, if regulatory arbitrage undermined the effectiveness of regulations, this could bring in de facto deregulation.

One task in this context is ensuring that regulatory arbitrage, in particular cross-border regulatory arbitrage, does not jeopardize the effectiveness of tighter regulation. This calls for more coordination of and cooperation in regulatory reform at the international level. It should be emphasized in this regard that, in order to ensure a level playing field, broad principles of financial regulatory reform need to be discussed within a multilateral process led by the G20, rather than through separate unilateral processes. In this context, the G20 has established an effective framework to prevent cross-border regulatory arbitrage through peer review and thematic review on the implementation of each reform agenda.

At the same time, cross-sectional arbitrage could equally undermine the effectiveness of the ongoing regulatory reform. In this context, the G20 Leaders’ request at the Seoul Summit for the FSB to address the potential that strengthened banking regulation would widen regulatory gaps vis-à-vis the shadow banking system makes great sense. Although the FSB is currently working very hard to finalize an effective regulatory framework for shadow banking system, building an effective system of regulating and overseeing the shadow banking system is a very complex issue. It is complex because the shadow banking system is by definition a rapidly evolving area in the financial system. Therefore, it is very important to proactively monitor financial innovations that establish new channels that may tend to grow in tandem. In addition, it is an urgent task to identify non-bank SIFIs and develop an effective regulatory framework for them in order to prevent cross-sectional regulatory associated with Basel III preemptively.

Another task is to make sure that the pendulum does not swing back too far. In particular, as the euro-zone crisis intensifies, some critics have begun to question the sustainability of the current regulatory reform. They have argued that many of the reform measures rely too heavily on financial sector taxation in the forms of capital regulation and capital surcharges on SIFIs. Going forward, they say, these measures could lead to a substantial increase in the cost of capital, even though the new norm for the global economy post-crisis does not appear likely to be very bright compared to the pre-crisis period. While this argument appears to be somewhat legitimate, there is also a strong case for maintaining the momentum of regulatory reform in order to prevent future crises. In particular, if the ongoing regulatory would be reversed or derailed, this could introduce another uncertainty, regulatory uncertainty, which could be an additional uncertainty in this extremely uncertain macroeconomic and financial environment.

To sustain the reform process, it is very important to strike a balance between the risk of over-regulation and that of under-regulation. Here are some suggestions for a more balanced approach. First, in order to reduce the burdens on the private sector caused by tightened regulation, greater emphasis should be placed on the reform of public policy to prevent future crises. In particular, one urgent task is building a robust macro-prudential policy framework that can prevent financial imbalances from acting as a root cause of future crises.

Second, more efforts should be made to identify and correct institutional distortions which encourage financial leverage by all economic actors. In this case, one obvious distortion is preferential tax treatment for debt financing. In particular, given the weak fiscal balances of major advanced economies, there appears to be a very compelling case for elimination of such preferential tax treatment at this time.

Another crucial area to be addressed is fundamental weaknesses in the corporate governance of financial firms. As argued by Roubini and Mihm,<sup>34</sup> many financial firms are exposed to the so-called “double agency conflict”. In many financial firms, the shareholders are themselves in a principal-agency problem. The shareholders own shares via large institutional investors, such as pension funds. The managers of these funds are their agents, not their principals. In this situation, it is very difficult for shareholders of financial firms to monitor what executives and traders of the firms are doing. The situation could go even worse, if the managers of these funds tend to pursue short-term profits. Although the G20 has implemented measures to enhance compensation practices, these measures appear to be a cure for symptoms rather than that for root causes of the problem. While recognizing that there is no one-size-fits-all solution for the problem, more efforts should be focused on improving the corporate governance structure of financial firms.

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<sup>34</sup> Roubini, Nouriel and Stephen Mihm, *Crisis Economics*, Penguin Books, 2011

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## Session 1

# International Monetary System Reform



### Panelist 1

## Marc Uzan

Executive Director of Reinventing Bretton Woods Committee, France

Marc Uzan is the Executive Director of the Reinventing Bretton Woods Committee ([www.rbwf.org](http://www.rbwf.org)) and was its founder in 1994. The Committee is a think-tank focusing on the international financial architecture issues through a regular dialog between markets and governments. He works closely with central banks, ministries of finance around the world, and also with the different chairs of the G20 since its inception in 1999, by bringing different stakeholders together in numerous seminars around the world on issues related to global finance. He is also the Secretary General of the Euro50Group ([www.euro50.org](http://www.euro50.org)), and Member of the Advisory Board of Central Banking.

Marc Uzan is the editor of numerous volumes: *Financial System Under Stress –A New Architecture of the World Economy*, Routledge, March 1996; *Private Capital Flows in the Age of Globalisation*, Edward Elgars Publishers, 2000; *Capital Flows without Crisis?* Routledge 2001. *The future of the international monetary System* (2004) and a handbook on the international financial architecture with Nouriel Roubini (2006), and *the International Monetary System , the IMF and the G20* (Palgrave 2007) and *the macroeconomics of globalisation* (2008).

He is the author of several academic papers on the new architecture for the international financial system. He holds a Master Degree in International Economics and Finance from the Université de Paris Dauphine. He has been a visiting scholar at the Department of Economics of the University of California, Berkeley.



## Session 1

# International Monetary System Reform



### Panelist 2

## Lee Il Houng

Chief Resident Representative Beijing, China International Monetary Fund

Mr. Lee joined the IMF through the Economist Program in 1989. Since then, he worked in various departments and his country assignments in Asia included a wide range of economies from Japan, Thailand, Malaysia, the Philippines and Vietnam. Before coming to China, he was an Advisor in the Asia and Pacific Department working as the mission chief on the Philippines.

Mr. Lee has a BSc in Economics from the London School of Economics, and a Ph.D. in Economics from Warwick University. He taught economics at Warwick University and at the National Economics University in Hanoi.

## Session 1

# International Monetary System Reform



### Panelist 3

## Maria Bautista

Senior Economic Advisor in the Economics and Research

Maria Socorro Bautista is currently Senior Economic Advisor in the Economics and Research Department of the Asian Development Bank. Her fields of interest are open economy macroeconomics and monetary policy. She previously held the Bangko Sentral ng Pilipinas Sterling Chair Professorship in Monetary Economics at the University of the Philippines School of Economics. Other previous appointments include the following: Assistant Professor of Economics at the University of Hawaii at Manoa, Visiting Research Fellow at the Federal Reserve Bank of San Francisco, and Senior Research Fellow at the Bank for International Settlements Office for Asia and the Pacific in Hong Kong SAR. She is a member and former Chair of the Asian Shadow Financial Regulatory Committee and a board member of the Institute for Strategic and Development Studies. She received a BA Economics degree from Mount Holyoke College, *Magna cum laude*, and a PhD Economics degree from Columbia University.

## Session 1

# International Monetary System Reform



Panelist 4

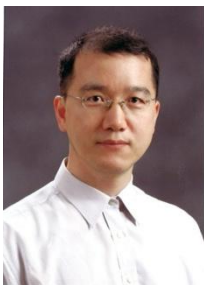
## Soyoung Kim

Professor at Seoul National University, Korea

Soyoung Kim is Professor at Department of Economics, Seoul National University. He received his PhD in economics from Yale University. Prior to his current position, he was on the faculty of University of Illinois at Urbana-Champaign and Korea University. He received research awards such as Arnould O. Beckman Research Award, Tae Sung Kim Research Award, Chung Ram Research Award, and NEAR Research Award. He was involved with various institutions like IMF, ADB, ADB Institute, Bank of Spain, and HKIMR, Bank of Korea, KIEP, KIF, AIRI, Ministry of Strategy and Finance in Korea, and Statistics Korea under various designations. He is a co-editor of Seoul Journal of Economics and associate editor of various journals including Journal of Macroeconomics, Asian Economic Journal, Asia-Pacific Journal of Financial Studies, and International Economics Journal. He published research articles in numerous journals including Journal of Monetary Economics, Journal of Money, Credit, and Banking, Journal of International Economics, Journal of International Money, and Finance, Journal of Banking and Finance, Macroeconomic Dynamics, and Scandinavian Journal of Economics.

## LUNCH REMARKS

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### Sang Che Lee

Standing Commissioner of Financial Services Commission, Korea

In March 2011, Dr. Lee became a Standing Commissioner of the Financial Services Commission of Korea for a three-year term.

Prior to his FSC appointment, he had worked as a Senior Fellow at Korea Institute of Finance from 1999 after receiving his Ph.D. in economics from Columbia University in New York in 1998.

During his tenure at KIF, Dr. Lee served as Senior Advisor to Minister Yoon Jeung-Hyun of the Ministry of Strategy and Finance from February 2009 to March 2011. He was also Senior Counselor to the Chairman of Financial Supervisory Commission (the predecessor to the FSC) from 2005 to 2007.

Dr. Lee also served on a number of government inquiries and advisory boards including Advisory Committee to the Board of Audit and Inspection, Government Funds Operation Assessment Task Force (Ministry of Planning and Budget), and National Informatization Evaluation Committee (Office for Government Policy Coordination).

He can be reached by phone at +82-2-2156-9503 or by e-mail at [sclee15@korea.kr](mailto:sclee15@korea.kr)

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**Session 2.**  
**Increase in Energy and Commodity Price  
and Volatility**  
**(14:00-16:00)**

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**Chair**

**Andrey Kortunov** Director General of Russian International Affairs Council, Russia

**PRESENTATIONS**

1. **Kym Anderson** Professor at University of Adelaide, Australia
2. **Suh Yong Chung** Professor at Korea University, Korea
3. **Kyong Wook Choi** Professor at University of Seoul, Korea  
**Dong Heon Kim** Professor at Korea University, Korea
4. **Patrick Messerlin** Professor at Sciences Po, France

**PANEL DISCUSSION**

1. **Hyun Hoon Lee** Professor at Kangwon National University
  2. **Jin Gyu Oh** Senior Researcher of Korea Energy Economics Institute
  3. **Tomoo Inoue** Professor at Seikei University, Japan
  4. **Chris Salatiello** Professor at Ajou University, Korea
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## Session 2

# Increase in Energy and Commodity Price and Volatility



Chair

## **Andrey Kortunov**

Director General of Russian International Affairs Council, Russia

Andrey Kortunov is the Director General of the Russian International Affairs Council, the President of the New Eurasia Foundation and Information Scholarship Education Center (ISE).

Mr. Kortunov graduated from the Moscow State University of International Relations and pursued postgraduate studies at the Institute for the U.S. and Canadian Studies (PhD in history) where he served as deputy director and head of the Foreign Policy Department.

Key academic interests: international affairs, foreign and domestic policy of Russia, Russian-American relations

He was a visiting professor at American universities including the University of California (Berkeley) and the University of Miami.

Andrei Kortunov is an author of more than 120 publications, focused on US-Soviet/Russian relations, international security issues, and Soviet/Russian domestic and foreign policy.

## Session 2

# Increase in Energy and Commodity Price and Volatility



### Presentation 1

## Kym Anderson

Professor at University of Adelaide, Australia

Kym Anderson is the George Gollin Professor of Economics, foundation Executive Director of the Wine Economics Research Centre, and formerly foundation Executive Director of the Centre for International Economic Studies at the University of Adelaide in Australia, where he has been affiliated since 1984. Previously he was a Research Fellow at the Australian National University's Research School of Pacific and Asian Studies (1977-83), following doctoral studies at the University of Chicago and Stanford University (1974-77); and in 2012 he rejoined ANU part-time as a Professor of Economics in the Arndt-Corden Dept of Economics in its Crawford School of Public Policy. He was on extended leave at the Economic Research division of the GATT (now WTO) Secretariat in Geneva during 1990-92 and at the World Bank's Development Research Group in Washington DC as Lead Economist (Trade Policy) during 2004-07. He is a Fellow of the AAEA, AARES, AAWE, ASSA and CEPR. He is also a member of the Board of Trustees of the Washington DC-based International Food Policy Research Institute, and of the Commission of Australia's Centre for International Agricultural Research. He has published more than 300 articles and 30 books, including *The Political Economy of Agricultural Protection* (with Yujiro Hayami), *Disarray in World Food Markets* (with Rod Tyers), *Agricultural Trade Reform and the Doha Development Agenda* (with Will Martin), *The World's Doha Development Agenda* and, during 2008-10, a set of 4 regional and 3 global books on *Distortions to Agricultural Incentives*. His publications have received a number of AAEA and AARES awards, including the 2010 Bruce Gardner Memorial Prize for Applied Policy Analysis.

## Food Price Volatility: What Role for Trade Measures?

### Abstract

The growing demand for food and energy raw materials in rapidly emerging economies, and the biofuel policy responses in Brazil, Europe, the United States and elsewhere, are prompting many governments to re-examine their strategies for dealing with both short-term and long-term food security concerns. The G-20 group have also expressed concern over the recent volatility of international food prices. Fear that extreme weather events associated with climate change will make food price spikes more frequent is adding to these concerns. In the past, governmental responses to both the long-term trend level of international food prices and to fluctuations around trend have not always been the most appropriate. In particular, trade policies rather than more-efficient domestic measures have been commonly employed, and by both high-income and developing countries. When many countries restrict their imports to alter the trend level of domestic prices, the net effect is to ‘thin’ international markets and thus lower the mean and increase the variance of international food prices. And when many countries make short-term adjustments to their trend level of trade restriction in an attempt to insulate their domestic market from fluctuations in international food prices, that response exacerbates those fluctuations in border prices. Progress has been made over the past 25 years in reducing both agricultural protection in high-income countries and agricultural disincentives in developing countries, but much scope remains to improve economic welfare, reduce income inequality and poverty, and their strategies for dealing with botoving remaining agricultural trade distortions. Furthermore, the propensity of governments to insulate their domestic food market from fluctuations in international prices has not waned. Both food-importing and food-exporting countries continue to engage in insulating behaviour, which amplifies international food price fluctuations. Moreover, biofuel subsidies and mandates are becoming a new form of agricultural protection that threatens to add to food price volatility by thinning international food markets and linking food and fuel prices. The paper concludes by examining how unilateral actions or multilateral trade arrangements could reduce food price volatility and simultaneously boost global food security.



Between 2004 and 2008, real food prices in international markets rose by more than 50 percent on average, with grain prices spiking in mid-2008. They began to drop back towards trend late in 2008, only to rise steeply again in 2010-11, along with the prices of energy raw materials. A drought in the northern hemisphere began to push grain prices higher again in mid-2012 (Figure 1). The first of those price spikes caused consumer panic among buyers of staples such as rice and wheat, and raised the cost of living dramatically for those poor households in developing countries who spend the majority of their budget on food. Not surprisingly it triggered urban food riots and other forms of socio-political instability in a wide range of developing countries, and may well have contributed to the overthrow of governments in 2008 in Haiti and Madagascar, and in 2011 in Egypt and Tunisia.

This combination of high and volatile food prices understandably raises global food security concerns. One consequence is that food price volatility has been high on the agenda of the G-8 and G-20 meetings (FAO et al. 2011). However, the set of factors influencing the long-run trend level of food prices is not the same as the set affecting the short-run volatility of food prices around that trend. As well, the distributional and poverty effects of food price spikes – and of policy responses to them – differ from the effects associated with changes in the trend price level. This is important to recognize because unless societies and governments clarify what concerns them most, and understand the underlying causes, they will not be able to identify the most appropriate and cost-effective policy actions or reforms to ease those concerns.

Over the second half of the 20th century, the real price of food in international markets fluctuated around a long-run downward trend of more than 1 percent per year (Pfaffenzeller, Newbolt and Rayner 2007). The conventional wisdom was that increasingly protectionist farm trade policies contributed to both the declining mean and the continuing volatility of those prices. It was presumed that those policies also added to global poverty, because the vast majority of the world's poor have depended directly or indirectly on agriculture for their livelihood<sup>35</sup> and were assumed to be net sellers of food and other farm products. That led to calls for agricultural trade liberalization on the grounds that such reform would boost not only aggregate world economic welfare but also global food security<sup>36</sup> through expanding world food supplies, lowering international price fluctuations, and reducing poverty.

However, the higher mean and variance of international food prices of the past few years are projected to persist for the foreseeable future (Rosegrant 2012a,b). Contributors to price volatility will include climate change and extreme weather events on the supply side, and biofuel mandates and the new link to fluctuating fossil fuel prices on the demand side.

A core message of this paper is that, despite the recent reversal in the international food price trend, national governments' foreseeable future (Rosegrant 2012a,b). Contributors to price volatility will

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<sup>35</sup> According to Ravallion, Chen and Sangraula (2007), 74 percent of people living on less than \$1 a day in 2002 were rural. That rural share was 69 percent in Sub-Saharan Africa (300 million), 75 percent in South Asia (350 million), and 85 percent in East Asia (180 million).

<sup>36</sup> Food security is defined as the state when all people, at all times, have access to a sufficient quantity of safe and nutritious food for an active and healthy life (FAO 2003, Pinstrup-Andersen 2009, Barrett 2010).

include climate change and extreme prices and (b) are now able to be replaced – thanks to the information technology revolution – by domestic social protection policy measures that can boost the food security of vulnerable individuals and households far more efficiently and more equitably than can trade-related, food-price-distorting measures.

The paper begins by reviewing analyses of the ways in which governments have responded in the past to year-to-year fluctuations around the long-run downward trend in international food prices. It reveals two patterns. One is in high-income (and some middle-income) countries, where variable import restrictions and export subsidies were used to a very considerable degree to protect and insulate their farmers from declining and fluctuating international prices. The other pattern is in many developing countries, where variable export taxes on agricultural products (plus overvalued exchange rates and import tariffs on manufactures) were used as a way to supplement government revenue, promote import-substituting industrialization and placate demands from urban wage-earners and their employers for lower and more stable prices for food staples. Those trends began to change in the 1980s with policy reforms in both of those country groups, but the propensity to insulate domestic food markets from international price fluctuations persists. The paper then turns to the question of how the changing structure of the world economy and international trade will affect the patterns of national trade-related policies over the next decade or two. A re-assessment is then made of the role that trade policy actions, both unilateral and multilateral, could make to global food security.

### **How have past policies dealt with international food price trends and fluctuations?**

Since the 1950s world agriculture has been characterized by the persistence of high agricultural protection in developed countries, by anti-agricultural and anti-trade policies in developing countries, and by the tendency for both sets of countries to vary their trade restrictions in an attempt to stabilize their domestic food market – thereby exacerbating price fluctuations in the international marketplace. The situation came to a head in the mid-1980s, with assistance to farmers in high-income countries peaking and international food prices plummeting in 1986, thanks in large part to an agricultural export subsidy war between North America and the European Community. Meanwhile, many developing countries had been holding down the incomes of their farmers. This was done not only by heavily taxing agricultural exports (or grain production-in-kind in numerous cases including China), but also, albeit indirectly, by protecting manufacturers from import competition and overvaluing the national currency.

This disarray in world agriculture, as Johnson (1973) described it, meant there was over-production of farm products in high-income countries and under-production in more-needy developing countries, as well as slow adjustment to international price fluctuations because both country groups insulated their domestic market. It also meant there was less international trade in farm products than would be the case under free trade, thereby ‘thinning’ the market for these weather-dependent products and thus adding to global commodity market volatility.

Tyers and Anderson (1992), using their dynamic, stochastic model of the world were over-production of farm products in high-income countries and under-production in more-needy developing countries, as well as slow adjustment to inprice-raising effect of developing countries' direct agricultural taxes in the 1980s, although only slightly. They also found that both sets of policies shrunk international food trade: by an estimated 25 percent because of industrial country policies, but by 56 percent when developing country policies were added (Tyers and Anderson 1992, Table 6.9). To estimate the extent to which this 'thinning' of the international food market added to its price volatility, those analysts ran 200 repeated simulations with random weather shocks. They concluded that the coefficient of variation of international food prices would have fallen by two-thirds, from 34 to 10 percent, if all countries had agreed in 1990 to cease their domestic price-insulating practice of varying their trade restrictions and instead maintain constant ad valorem trade tax rates. In most of the 16 developing economies they considered individually, the coefficient of variation for domestic food prices (the standard deviation divided by the mean) would have fallen substantially if all countries had agreed multilaterally to refrain from using price-insulating measures (Tyers and Anderson 1992, Table 6.14).

Since the mid-1980s, numerous countries have been reforming their agricultural price and trade policies: high-income countries have gradually lowered their assistance to farmers, have converted quantitative trade barriers to tariffs, and have decoupled some of that support from production. Many of those tariffs are specific rather than ad valorem though, which naturally provides some insulation from fluctuating international prices even if no other changes are made. Meanwhile, developing countries have steadily lowered their farm export taxes and tariffs on imports of manufactures and have moved toward market-determined exchange rates. Some, however, have also raised their tariffs on agricultural imports, again often using naturally-insulating specific tariffs.

To examine the extent of those reforms, the World Bank recently undertook a multi-country empirical study of trade-related price distortions from 1955 to 2007 (Anderson 2009). Those estimates have since been further updated to 2009/10 (Anderson and Nelgen 2012b). These latest World Bank data cover 82 countries, which together account for more than 92 percent of the world's population, farmers, agricultural GDP, and total GDP and employment. Nominal Rates of Assistance (NRAs) and Consumer Tax Equivalents (CTEs) are computed for 75 different farm products, with an average of almost eleven products per country. This product coverage represents about 70 percent of the gross value of agricultural production in each of the focus countries and thus just under two-thirds of global agricultural production when valued at undistorted prices over the period covered. Such comprehensive coverage of countries, products and years offers the prospect of generating a reliable picture of long-term trends in policy indicators and annual fluctuations around those trends for individual countries and commodities, as well as for country-groups, regions, and the world as a whole.

Several indicators of price distortions are provided. The simplest one is the NRA, which is computed for each product as the percentage by which government policies have raised gross returns to farmers above what they would have been had the government not intervened (or lowered them, if

NRA < 0). This rate includes any product-specific input subsidies or taxes, plus the price-depressing effect for each product of multiple and overvalued exchange rates (see Anderson et al. 2008 for details). A weighted-average NRA for all available products is derived using production valued at undistorted prices as product weights.<sup>37</sup> Each commodity's price distortions are provided. The simplest one is the NRA, which is calculated as the ratio of the value of production of a nontradable, so as to generate for each year the weighted-average NRAs for these three subsets of covered products. Note that a given industry's trade status can change over time.

### Three key findings since the 1980s

The World Bank's findings since the 1980s are provided. The simplest one is the NRA, which is calculated as the ratio of the value of production of a nontradable, so as to generate for each year the weighted-average NRAs for these three subsets of covered products. Note that a given industry's trade status can change over time.

First, assistance to farmers in high-income countries was on an upward trend until the mid-1980s, when the NRA peaked at an average of 60 percent during the food export subsidy war, before following a downward trend over the second half of this period to just one-quarter of that peak rate.

Second, farmers in developing countries were taxed at more than 20 percent of their gross value of production on average for the first two decades of this period, but the extent of that dis-protection gradually diminished and by the mid-1990s had switched from negative to slightly positive assistance on average.

Third, in both rich and poor countries the NRA for farmers fluctuated around the long-run trends of production on average for the first two decades of this period, but the extent of that dis-protection rose sharply in 1973-74 and 2008 when international food prices spiked up, and did the opposite in 1986-87 when international food prices slumped.

### Two further findings

Two more pertinent findings from the recent World Bank study can be seen from the developing country indicators summarized in Figure 3. One is that while the NRA in developing countries has been rising for farmers over the past few decades, it has been falling for producers of non-farm tradables (mostly manufactures). Indeed by the end of the 20th century the former exceeded the latter, so the estimated relative rate of farmer assistance (RRA)<sup>38</sup> rose above zero for the first time (Figure 3(a)). This suggests that developing country governments on average are no longer

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<sup>37</sup> Since the 1980s, some high-income governments have also provided decoupled assistance to farmers. Because that support, in principle, does not distort resource allocation, its NRA has been computed separately and is not included for comparison with the NRAs for developing countries when the focus is price distortions. Not included are estimates of the subsidy equivalent of irrigation water or biofuel policies. On the difficulties of measuring these excluded items, see Dinar (2012) and de Gorter, Drebnik and Kliauga (2011), respectively.

<sup>38</sup> The relative rate of farmer assistance is defined in percentage terms as:

$$RRA = 100 * [(100 + NRA_{Ag}^t) / (100 + NRA_{Nonag}^t) - 1]$$

where  $NRA_{Ag}^t$  and  $NRA_{Nonag}^t$  are the percentage NRAs for the tradable parts of the agricultural (including noncovered) and non-agricultural sectors, respectively. See Anderson et al. (2008).

discriminating against their farmers through their price-distorting policies. It needs to be kept in mind, however, that within the developing country group – not to mention among high-income countries – the spectrum of national RRA estimates as of 2000-04 remained very wide (Figure 4), indicating great scope still for global economic welfare gains from further trade liberalization.

The other additional finding to note is that when the NRAs for those developing countries governments on average are no longer discriminating against their farmers that is evident that only the latter group has suffered negative NRAs. Indeed the import-competing sub-sector of farmers in developing countries enjoyed positive and rising protection over this long period, as seen by the regression trend line in the upper half of Figure 3(b) – just as occurred in earlier decades for farmers in high-income countries.

These findings suggest that export-focused farmers in developing countries are still discriminated against in two respects: by the anti-trade structure of assistance within their own agricultural sectors, and by the remaining protection afforded farmers in high-income countries.

As part of these policy reforms over the past quarter-century, has the extent to which governments allow the transmission of international food price changes to domestic markets increased? And would the removal of remaining trade restrictions, at least as of 2004 before international food prices began rising steeply, have reduced global poverty? These questions are considered in turn before this historical section concludes by examining the contribution of variable trade restrictions to recent and previous spikes in international food prices.

### **International-to-domestic food price transmission**

The tendency for each country to transmit less than fully any fluctuations in international food prices away from their trend has been widespread and systematic. It means the estimated NRA for each product also fluctuates, and in the opposite direction to the international price. This can be seen clearly for rice, and to a lesser extent for wheat, in Figure 5 – despite the fact that the NRA is averaged over all 82 countries in our sample.

This propensity for national governments to alter individual product NRAs from year to year around their long-run trend does not appear to have diminished as part of the trade-related policy reforms that began in the mid-1980s. Table 1 focuses on the NRA's annual average deviation from trend in the two decades before versus after 1985. That average deviation from trend NRA is more than one-tenth higher in the latter two decades than in the earlier two decades in just as many cases as it is more than one-tenth lower. Nor is there much difference as between developing and high-income countries. Notice too that the deviations are non-trivial: except for rice in high-income countries, the average deviation is well above the mean NRA for each product (which is reported in the right-hand half of Table 1).

To estimate the proportion of any international price fluctuation that is transmitted to domestic markets within twelve months, Anderson and Nelgen (2012a) follow Nerlove (1972) and Tyers and

Anderson (1992, pp. 65-75) in using a partial-adjustment geometric distributed lag formulation to estimate short-run transmission elasticities for each product for all focus countries for the period 1985 to 2010. Table 2 summarizes those estimates for nine key traded foods. The average of the estimates for the short-run elasticity over the 25 years to 2010 ranges from 0.73 for soybean down to just 0.43 for sugar. The unweighted average across those nine products is 0.56, suggesting that, within one year, barely half the movement in international prices of primary food products is transmitted to domestic markets on average. These estimates are consistent with a recent study by Minot (2011) of 11 Sub-Saharan African countries: despite using a somewhat different methodology, he estimated short-run price transmission elasticities for key staple foods that averaged 0.63. In short, trade policies are still insulating domestic markets from the volatility of international food markets.<sup>39</sup>

Despite the comprehensiveness of trade reforms since the 1980s, they raised only very slightly the global extent to which farm products are traded: the share of primary agricultural production exported globally, including intra-European Union trade, rose only one percentage point in the two decades to 2000-04 (Sandri, Valenzuela and Anderson 2007). One reason for this small aggregate global response is that high-income countries lowered not only their import restrictions but also their export subsidies, with the latter offsetting somewhat the trade-expanding effect of cuts in import tariffs. A second reason is that while developing countries phased out their farm export taxes, they also raised their tariffs on farm imports (Figure 3(b)) – the latter again offsetting somewhat the trade-expanding effect of cuts in export taxes. As a result, international food markets are not much ‘thicker’ now than they were a quarter-century ago.<sup>40</sup>

According to global economy-wide modelling results reported in Valenzuela et al. (2009), liberalization of remaining trade barriers as of 2004 would raise the share of farm production exported globally from 8 to 13 percent. Thus plenty of scope still remains for trade reform to ‘thicken’ international food markets and thereby make them less volatile. That study also finds the developing countries’ share of global exports of farm products would rise from 55 to 64 percent if trade was fully liberalized, suggesting more of those countries would become net food exporters and thus would be net beneficiaries of the higher international food prices of recent years and prospectively.

### **Poverty effects of trade policies as of 2004**

Even if trade policies were not contributing to international food price volatility (of which more below), what can be said about their poverty effects as of 2004, before international food prices began rising steeply? A recent detailed study addresses that issue using numerous global and national economy-wide models, all calibrated to 2004 and incorporating the same World Bank estimates of

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<sup>39</sup> This is of course not to deny that high costs of trading across borders of low-income countries reduce their ability to trade profitably; but the above findings also relate to higher-income countries, and refer to the most tradable of farm products.

<sup>40</sup> This is consistent with a global model back-casting exercise to see how much different global markets would have been in 2004 if the trade policies of 1980-84 had remained in place. The results suggest the share of farm production traded globally would have been no more than one percentage point different as a result of that quarter-century of reform (Valenzuela et al. 2009, Table 13.8).

national price distortions as discussed above (provided for modelers by Valenzuela and Anderson 2008). The results are reported in Anderson, Cockburn and Martin (2010) and are summarized in Anderson, Cockburn and Martin (2011).

The World Bank policies were not contributing to international food price volatility (of reduced under the full merchandise trade reform: there would be 2.7 percent (26 million) fewer people living on less than US\$1 a day in developing countries, and 3.4 percent (87 million) fewer on less than US\$2 per day. That result is based on a simple assumption that any increase in per capita income will have a poverty reducing effect as captured in econometric estimates of poverty elasticities. However, it is bolstered by results from ten more-detailed individual country case studies. These case studies focus on price-distorting policies as of 2004 too, but they are able to include more sectoral and product disaggregation than can global models, and they make use of national survey data to consider multiple types of households and types of labor. When all merchandise trade is liberalized in each of these country case studies, the poverty reduction ranges from close to zero to about 3.5 percentage points, except for Pakistan where it is more than 6 points. On average nearly two-thirds of the alleviation is due to non-farm trade policy reform, and the contribution of own-country reforms to the reduction in poverty appears to be equally as important as rest-of-world reforms.

Those country case study estimates of national poverty alleviation are also sub-divided into rural and urban sources. In every case rural poverty is reduced much more than urban poverty. This is true for both farm and non-farm trade policy reform, and for own-country as well as rest-of-world reform. Since the rural poor have been and are much poorer on average than the urban poor (Ravallion, Chen and Sangraula 2007), this would lead one to expect trade policy reform to also reduce inequality – and that is indeed what the results show for this sample of countries.

These poverty findings for permanent full trade liberalization of all goods are of course not expected to be the same as those resulting from a temporary alteration of trade restrictions in response to a spike in international prices for one or a few food items. Comprehensive empirical studies of the latter, as they relate to the recent food price spikes, are under way, but it is too early to be able to draw general conclusions. One study of the poverty impact in 28 developing countries found quite heterogeneous results but concluded that the 2010 price spike for 38 agricultural commodities pushed an extra 68 million food-deficit people into poverty and raised only 24 million food-surplus people out of poverty at the extreme poverty line of \$1.25 per day (Ivanic, Martin and Zaman, forthcoming). A more-recent but still preliminary study of the rise in just grain and oilseed prices during 2006-08, by Anderson, Ivanic and Martin (2012), also finds a high proportion of developing countries in which poverty appears to have risen – but that study shows that the net poverty-reducing impact of insulating the domestic market from the international price rise is much less than its apparent impact once the combined effect of all governments' responses on amplifying the international price rise is taken into account.

### **Contribution of variable national trade restrictions to spikes in international food prices**

National governments clearly dislike domestic food price volatility: net buyers of food complain about price rises, while net sellers (farmers) complain when their output prices fall. However, when some governments alter the restrictiveness of their food trade measures to insulate their domestic markets somewhat from international price fluctuations, the volatility faced by other countries is amplified. That reaction therefore prompts more countries to follow suit. The irony is, however, that when both food-exporting and food-importing countries so respond, each country group undermines the other's attempts to stabilize its domestic markets. That is, what seems like a solution to each country's concern if it were acting alone turns out to be less effective, the more other countries respond in a similar way – just like when people stand in a football stadium. This is a classic international public good problem.

That effect can be seen by considering two country groups, food importers and food exporters. Suppose a severe weather shock at a time of low global stocks causes the international food price to suddenly rise. Those national governments wishing to avert losses for domestic food consumers may alter their food trade restriction so that only a fraction of that price rise is transmitted to their domestic market. For example, imposing or raising an export tax on food exports would ensure the domestic price in a food-surplus country rose less than the border price. Similarly, lowering any import tax on food would mean the domestic price in a food-deficit country would rise less than the price of an imported substitute. Hence it is not surprising that governments, in seeking to protect domestic consumers from an upward spike in international food prices, consider a variation in their degree of trade restriction as an appropriate response. That response raises the consumer subsidy equivalent/lowers the consumer tax equivalent of any such trade measure, and does the opposite to producer incentives (the NRA falls).

However, if such domestic market insulation using trade measures is practiced by large countries, or by a sufficiently large number of small countries, it turns out to be not very effective in keeping domestic price volatility below what it would be in the international marketplace if no government so responded.

To see why this can lead to ineffective outcomes when both food-deficit and food-surplus country groups so respond, it is helpful to refer to Figure 6, which depicts the international market of food. In a normal year, the excess supply curve for the world's food-exporting countries is  $ES_0$  and the excess demand curve for the world's food-importing countries is  $ED_0$ . In the absence of any trade costs such as for transport, equilibrium in a normal year would be at  $E_0$  with  $Q_0$  units traded at international price  $P_0$ .

An adverse season in some exporting countries at a time when global stocks are low would shift the excess supply curve leftwards to  $ES_1$ . If there were no policy responses, the equilibrium would shift from  $E_0$  to  $E_1$ , and the international price and quantity traded across national borders would change from  $P_0$  and  $Q_0$  to  $P_1$  and  $Q_1$ . However, if the higher price prompts governments to alter their trade restrictiveness, there will be additional effects.

On the one hand, suppose some of the food-exporting countries choose to impose or raise a



food export tax (or, in the extreme, impose an export ban). That would move the excess supply curve further to the left, say to ES2. This would move the equilibrium to E2 and raise the international price further, to P2 -- but the domestic price in those export-restricting countries would be  $P_x$  which is below P1. Such a reaction thus provides partial insulation in those exporting countries from the initial exogenous shock to the international market. Furthermore, their combined actions reduce aggregate exports to Q2 and cause the international terms of trade to turn further in their favor, because of the additional reduction in available supplies on the international market. That means, however, that food-importing countries face an even higher international price, at P2 instead of P1.

On the other hand, suppose some protective food-importing countries were to reduce their barriers to food imports in response to the international price rising from P0 to P1. That would shift the excess demand curve to the right, say to ED'. In that case the new equilibrium would be at E', involving Q' units traded at international price P'. That response would provide partial insulation in those food-importing countries from the initial exogenous shock to the international market: their domestic price would rise by only MN instead of by ME' in Figure 6. However, the combined actions of those importing countries would cause the international terms of trade to turn further against them.

What if both country groups intervene, each seeking to at least offset the effect on their domestic price of the other country group's policy response? In practice, the more one group seeks to insulate its domestic market, the more the other group is likely to respond. The example of such actions shown in Figure 6 involves the curves shifting simultaneously to ES2 and ED' both country groups intervene, each seeking to at least offset the effect while the domestic price in each country group would be lower by E3E1. That is, in that particular case the domestic price (and the quantity traded internationally, Q1) would be exactly the same as if neither country group's governments had altered their trade restrictions. The terms of trade would now be even better for the food-exporting country group, and even worse for food-importing countries. Aggregate global welfare would be the same as it would be if neither country group so intervened, but there would be an economic welfare transfer from food-importing to food-exporting countries, via the terms of trade change, equal to areas P1E1E3P3.

Conversely, if the exogenous weather shock was of the opposite sort (a bumper global harvest) that depressed the international price even after purchases by stockholders, and if governments sought in that case to protect their farmers from the full force of the price fall, the international price fall would be accentuated to the benefit of food-importing countries.

Clearly, both such attempts at domestic price insulation exacerbate international price volatility while doing little or possibly nothing to assist those most harmed by the initial exogenous weather shock.

More than that, this use of trade measures can be inefficient and possibly inequitable, and it may even add to global poverty despite a possible part of its motivation being to reduce the risk of a rise in national poverty. To see that, note that an import tax is the equivalent of a consumer tax and a producer subsidy, hence lowering it also reduces the extent to which the measure assists producers of the product in question. Likewise, an export tax is the equivalent of a consumer subsidy and a

producer tax, so raising it not only helps consumers but also harms farmers. If farming is thereby discouraged in both food-importing and food-exporting countries, the demand for labor on farms falls, and with it the wages of low-skilled workers not only in farm jobs but also in non-farm jobs – and more so the more agrarian is the economy. Thus while poor households may benefit on the expenditure side from a measure that reduces the extent to which the cost of food consumption would otherwise rise, they could be harmed on the earnings side if they are sellers of food or suppliers of low-skilled labor. Such trade policy responses therefore could add to rather than reduce poverty (Ivanic and Martin 2008; Aksoy and Hoekman 2010). And even if there are some countries whose poverty is reduced by the change in their trade restrictions in response to a price spike, that response will have exacerbated the international price spike and hence worsened the incidence of poverty in those countries where the spike expanded the number of poor. The net effect could therefore be a worsening of global food insecurity, depending in part on whether the policy actions were more or less in food-importing countries than in food-exporting countries.<sup>41</sup>

Martin and Anderson (2012) point out that, with the help of some simplifying assumptions, it is possible to get at least a back-of-the-envelope estimate of the extent to which government trade policy reactions contribute to an international price spike such as in 2006-08. They do so by assuming a homogenous product whose global market equilibrium condition, assuming perfect competition and zero trade costs, is:

$$\sum_i (S_i(p_i) + v_i) - \sum_i D_i(p_i) = 0$$

where  $S_i$  is the supply in country  $i$ ;  $p_i$  is the country price of some simplifying assumptions, it is possible to get at least a back-of-the-envelope estimate of the extent to which government trade policy reactions contribute to an international price spike. They assume further that border measures are the only price-distorting policy intervention used, in which case one can define a single variable for the power of the trade tax equivalent,  $T_i = (1 + t_i)$  where  $t_i$  is country  $i$ 's rate of tax on trade. Totally differentiating equation (1), rearranging it, and expressing the results in percentage change form yields the following expression for the impact of a set of changes in trade distortions on the international price  $p^*$ , assuming the policy changes are independent of the exogenous supply shocks:

$$\hat{p}^* = \frac{\sum_i H_i \hat{v}_i + \sum_i (H_i \gamma_i - G_i \eta_i) \hat{T}_i}{\sum_i (G_i \eta_i - H_i \gamma_i)}$$

where  $\hat{p}^*$  is the proportional change in the international price;  $\hat{v}_i$  is an exogenous stochastic shock to output such as might result from above or below average weather;  $\eta_i$  is the price elasticity of demand; at least a back-of-the-envelope estimate of the extent to which government trade policy reactions contribute to an international price spike. They assume  $i$  in global production. That is, the impact on

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<sup>41</sup> A preliminary study that examines the earning and spending patterns of 29 developing countries (but does not include China, and does not capture the effects on incomes via wages and other factor prices) finds that in those countries' poor on average are net buyers rather than sellers of traded grain and oilseed products and thus their poverty would worsen when domestic food prices rise. The insulation they and others practised during the 2006-08 food price spike appears to have lessened the rise in aggregate poverty in those countries, even if their actions may have worsened poverty in other countries (Anderson, Ivanic and Martin 2012).

the international price of a change in trade distortions by country  $i$  depends on the importance of that country in global demand and supply ( $G_i$  and  $H_i$ ), as well as the responsiveness of its production and consumption to price changes in the country (as represented by  $\gamma_i$  and  $\eta_i$ ).

If it is assumed that output cannot respond in the short run, and that inventory levels are low enough that stock adjustments have limited effect (as is typically the case in a price spike period obal demand and supply ( $G\gamma_i=0$ ). If one further assumes that the national elasticities of final demand for the product ( $u_i$ ) are the same across countries, then equation (2) reduces to:

$$-\sum_i G_i \hat{T}_i = \hat{T}$$

which is just the negative of the consumption-weighted global average of the  $\hat{T}_i$ 's, call it  $\hat{T}$ . However, if the changes in trade restrictiveness are not independent of the exogenous supply (or any other) shocks, then

$$\hat{p}^* = \hat{T} + R + (\hat{T} * R),$$

from which it follows that  $R = (\hat{p}^* - \hat{T}) / (1 + \hat{T})$ , where  $R$  refers to the rest of the influences on  $\hat{p}^*$ . In that case, and if the interaction term is distributed proportionately, the contribution of the changes in trade restrictiveness to the international price change, in proportional terms, is  $\frac{\hat{T}}{\hat{T} + R}$ .

Estimates of those indicators are summarized for the key grains in Table 3. For rice,  $-\hat{T}$  (the cumulative proportional decline in the Nominal Assistance Coefficient, where  $NAC = 1 + NRA/100$ ) is shown in the first row of Table 3 to be 0.37 between 2006 and 2008. The comparable numbers for wheat and maize are 0.12 and 0.08, respectively. According to World Bank (2011) data, the international price of rice increased by 113 percent between 2006 and 2008, and the prices of wheat and maize by 70 and 83 percent, respectively (middle rows of Table 3). Thus these estimates suggest that altered trade restrictions during the 2006-08 period caused international prices to be higher by 0.40 for rice, 0.19 for wheat, and 0.10 for maize (bottom third of Table 3). The unweighted average of these three, at 0.23, is the same as for 1972-74 (first column of Table 3), although the price spikes were somewhat larger then.

It is possible to apportion those policy contributions between country groups. Table 4 reports the contributions of high-income versus developing countries, and also of exporting versus importing countries. During 2006-08, developing countries were responsible for the majority of the policy contribution to all three grains' price spikes, whereas in 1972-74 the opposite was the case except for rice. As for exporters versus importers, it appears exporters' policies had the majority of the influence, other than for wheat in the 1970s, but importers made a very sizeable contribution as well.

Finally, it is now possible, in the light of these estimates, to get a sense of how effective were changes in trade restrictions in limiting the rise in domestic prices. The proportional rise in the international price *net of* the contribution of changed trade restrictions is  $R / (\hat{T} + R)$ . That fraction, when multiplied by the international price rise shown in the middle part of Table 3, is reported in the second column of Table 5, where it is compared with the proportional rises in the domestic price in the

sample countries. The numbers for 2006-08 suggest that, on average for all countries in the sample, domestic prices rose slightly more than the adjusted international price change for wheat, and only slightly less for maize and just one-sixth less for rice. The extent of insulation was greater in developing countries, especially for wheat and maize, which is consistent with the finding from the middle columns of Table 4 that their policymakers contributed more to the price spike than governments of high-income countries. These results suggest that the combined responses by governments of all countries have been sufficiently offsetting as to do very little on average to insulate domestic markets from this recent international food price spike. This is not to rule out the possibility that some developing countries' actions may have reduced the number of their households that otherwise would have temporarily fallen into poverty (as appears to be supported by the findings for a sample of low-income countries by Anderson, Ivanic and Martin 2012), but rather to stress that when many countries do this and in offsetting ways it creates an international public 'bad' that can adversely affect third countries.<sup>42</sup>

### **How might trade policy developments affect global food security?**

With the above insights it is now possible to turn to the question of how the changing structure of the world economy and international trade will affect the patterns of national trade-related policies over the next decade or two, and how together these developments will affect global poverty, food insecurity and socio-political instability.

The global financial crisis and the on-going economic recession in Europe seem set to ensure that emerging economies will continue to grow faster than high-income countries. The rapid growth (doubling) of the developing economies recession in Europe seem set to ensure that emerging economies will continue to grow faster than high-income countries. onal trade-related policies over the next decade or two, and how together (Gertler 2012a, Hanson 2012). Industrialization in those emerging economies is deepening global production networks and contributing to greater trade in intermediate inputs, but it is also continuing to drive the strong demand for farm products and industrial raw materials, including for energy production. If this, together with only slow increases in the taxing of carbon emissions globally, holds fossil fuel prices at current high levels as expected (IEA 2011), the United States and the European Union are likely to retain their biofuel subsidies and mandates for energy self-sufficiency reasons. This would mean prices for food and fuel will remain closely linked – in both height and volatility (Hertel and Beckman 2011, de Gorter, Drebnik and Klika 2011). Food production variability is expected to increase too, thanks to climate change.

Under that scenario of a continuation of historically high and variable food (and fuel) prices in international food markets, what should one expect in terms of trend and volatility of rates of

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<sup>42</sup> There is yet another way in which the sporadic imposition of food export restrictions generates an international public 'bad', namely in reducing food-deficit countries' willingness to remain dependent on food imports. The rise of agricultural protection in East Asia from the early 1970s may have been partly driven by such concerns following food-exporting countries' reactions to the 1972-74 food price spike.

government assistance to agriculture?

In terms of the long-run trend in NRAs, if international food prices stay high then high-income countries are unlikely to return to their former agricultural protection growth path. However, people and governments in emerging/industrializing economies a, Hpecially large ones such as China, India and Indonesia – may well feel more food-insecure if their farm sectors become less able to compete for mobile resources (despite higher international food prices) while domestic food and feed demands grow. Continuing growth in their agricultural protection cannot be ruled out therefore, even if international food prices remain high (Anderson and Nelgen 2011). Ironically, that will raise their domestic prices of foods increasingly above those at their borders, thereby undermining food security for all their households except those that are net sellers of food and maybe some remaining farm laborers. The latter group will become an ever-smaller share of the population and workforce in the course of economic growth, but whether they become a smaller share of the poor in those countries is difficult to anticipate. Hence it is unclear what impact agricultural protection growth would have on their national poverty rate. Certainly their per capita food consumption would grow less rapidly, and their farm protection growth would dampen international food prices somewhat (Anderson and Strutt 2012b). However, if average incomes in those emerging economies continue to grow rapidly then domestic socio-political stability is more likely to be helped by assistance to farmers that reduces urban-rural income inequality; and the slight dampening of international food prices may well reduce the risk of socio-political instability in poorer developing countries. This is not to say, however, that rising agricultural protection is the best way for emerging economies to deal with these concerns – see the final section below.

As for fluctuations in NRAs around trend, past behavior leads one to expect both high-income and developing country governments to continue to alter their food trade restrictions so as to insulate their domestic markets somewhat from international food price volatility. For the reasons laid out in the previous section, this behavior will continue to amplify price fluctuations in the international market and, if both exporting and importing countries continue to respond similarly, such interventions will keep being rather ineffective in preventing fluctuations in domestic food prices. How severe such volatility might be will depend on the size of any unanticipated exogenous shocks to world food markets and the global stocks-to-use ratios of the affected products at the time of any such exogenous shocks. If stocks were to be very low when harvests failed in significant regions, food price spikes of the magnitude experienced in 2008, early 2011 and mid-2012 could well be repeated if countries do not agree multilaterally in the meantime to desist from altering their trade restrictions at such times.

### **Policy implications**

What policy actions, both unilateral and multilateral, could contribute to global food security? The above empirical evidence supports the view that national trade restrictions add non-trivially to international food price volatility in at least two ways: through ‘thinning’ international food markets,

and through ‘insulating’ domestic food markets from international price fluctuations. Together those policy attributes magnify the effect on international prices of any shock to global food supply or demand, especially to upward price spikes when global food stocks are low.

The solution to the first ( supports the view that national trade restrictions add non-trivially to international food price volatility in at lfood trade. If food price spikes cause food riots, then reducing the risk of such socio-political instability is an additional benefit from global trade liberalization on top of the usual welfare gains measured by economists. The political difficulty and the adjustment costs associated with such reform are minimized if countries can agree to liberalize their food and agricultural markets multilaterally, and to do so at the same time as non-agricultural markets are liberalized. That was what happened in the Uruguay Round, and it is what has been aspired to by members of the World Trade Organization (WTO) via their Doha Development Agenda (DDA). After more than a decade of negotiating, the DDA has come to a standstill. There is still hope that the talks will be revived, and there is a body of new evidence to suggest that the gains from reaching an agreement with the elements that were on the table in August 2008 would be considerably more than was previously thought (Martin and Matoo 2011). Meanwhile, various plurilateral negotiations on options for regional integration and free-trade areas are under discussion, but the benefits from them are always far smaller than (and may even undermine) those from a multilateral agreement – and often agriculture is the sector liberalized least in preferential trade agreements (Anderson 2013).

The optimal solution to the second ( the view that national trade restrictions add non-trivially to international food price volatility in at lfood trade. If food price spikes cause foo countries can be offset by those of other countries to the point that the interventions become ineffective in achieving their stated aim of reducing domestic food price volatility. This is a classic international public good problem that could be solved by a multilateral agreement to restrain the variability of trade restrictions.

One of the original motivations for the Contracting Parties to sign the General Agreement on Tariffs and Trade (GATT, WTO)rice volatility in at lfood trade. If food price spikes y to world trade. To that end the membership adopted rules to encourage the use of trade taxes in place of quantitative restrictions on trade (Article IX of the GATT), and managed to obtain binding commitments on import tariffs and on production and export subsidies as part of the GATT’s Uruguay Round Agreement on Agriculture. However, those bindings continue to be set well above applied rates by most countries, leaving plenty of scope for varying import restrictions without dishonoring those legal commitments under WTO. Meanwhile, there are no effective disciplines on export taxes, let alone bindings.

In the current Doha round of WTO negotiations there are proposals to phase out agricultural export subsidies as well as to bring down import tariff bindings, both of which would contribute to global economic welfare, to the ‘thickening’ of food and agricultural markets, and thereby to more-stable international food prices and fewer food riots. However, proposals to broaden the Doha agenda to also introduce disciplines on export restraints have struggled to date to gain traction. A proposal by Japan (2000), for example, involved disciplines similar to those on the import side, with export restrictions to be replaced by taxes and those export taxes to be bound and gradually phased down. A

year later Jordan (2001) proposed even stronger rules: a ban on export restrictions and, as proposed for export subsidies, the binding of all export taxes at zero. However, strong opposition to the inclusion of this export item on the Doha Development Agenda has come from several food-exporting developing countries, led by Argentina (whose farm exports have been highly taxed since its large currency devaluation at the end of 2001). This reflects the facts that traditionally the demanders in WTO negotiations have been dominated by interests seeking market access, and that upward price spikes are infrequent. Yet the above analysis reveals the need for symmetry of treatment of export and import disciplines in the WTO.<sup>43</sup>

If WTO member countries were to liberalize their food trade and bind their trade taxes on exports as well as imports at low or zero levels, and assuming there would still be occasions when international food prices spike, what alternative instruments could they use to avert losses for significant groups in their societies?

A standard answer from economists is that food security for consumers, most notably food affordability for the poor, is best dealt with using generic social safety net measures that offset the adverse impacts of a wide range of different shocks on poor people – net sellers as well as net buyers of food – without imposing the costly by-product distortions that necessarily accompany the use of *n*<sup>th</sup>-best trade policy instruments for social protection. That might take the form of targeted income supplements to only the most vulnerable households, and only while the price spike lasts. To help fund such instrument switching, perhaps such changes could be included in the proposed ‘aid-for-trade’ part of the WTO’s Doha agenda, so that those urban taxpayers whose real incomes would fall when food prices spike would not feel doubly harmed by also seeing the government use their taxes to fund such a transfer.

This standard answer has far greater power now than just a few years ago, thanks to the digital information and communication technology (ICT) revolution. In the past it has often been claimed that such payments are unaffordable in poor countries because of the fiscal outlay involved and the high cost of administering such handouts. However, recall that in roughly half the cases considered above, governments of food-importing countries *reduce* their trade tax rates, so even that intervention may require a drain on the budget of many finance ministries – communicating a non-prohibitive export tax with a ban. In any case, the option of using value-added taxes in place of trade taxes to raise government revenue has become common practice in even low-income countries over the past decade

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43 Such symmetry also would be helpful in times of downward price spikes. Some developing countries have added to the WTO’s Doha Agenda a proposal for a Special Safeguards Mechanism (SSM) that would allow them to raise their agricultural import barriers above their bindings for a significant proportion of farm products in the event of a sudden international price fall or an import surge. This is the exact opposite of what is needed by way of an international public good to reduce the frequency and amplitude of downward food price spikes (Hertel, Martin and Leister 2010). Evidence provided by Anderson and Nelgen (2012a) for the mid-1980s suggests that if food-importing countries were to exercise that proposed freedom when international prices slump, food-surplus countries would respond by lowering their export restrictions – thereby weakening the efforts of the food-importing countries to insulate their domestic markets from the international price fall – and further depressing that price.

or two. Moreover, the ICT revolution has made it possible for conditional cash transfers to be provided electronically as direct assistance to even remote and small households, and even to the most vulnerable members of those households (typically women and their young children – see, e.g., Fiszbein and Schady (2009), Adato and Hoddinott (2010), Skoufias, Tiwari and Zaman (2010) and Alatas et al. (2012)).

What if countries are still unsatisfied with the contribution of their farmers to national food security, as reflected for example in food self-sufficiency ratios, or feel their farmers are missing out on the benefits of rapid economic growth and industrialization? Again agricultural import protection measures are far from first-best ways of dealing with these socio-political concerns. Alternative measures include subsidizing investments in agricultural R&D, rural education and health, and roads and other rural infrastructure improvements. If the social rates of return from those investments are currently high and above private rates of returns, as is typically the case in developing countries, expanding such public investments will be nationally beneficial. So too could be improvements in land and water institutions that determine property rights and prices for those key farm inputs. Should those changes at the same time reduce rural under-employment and poverty, and slow out-migration of workers to urban areas, they may also lower the risk of socio-political instability.

The challenge of encouraging countries to switch from trade to domestic policy instruments for addressing non-trade domestic concerns is evidently non-trivial, and not least because governments' stated policy objectives are not always the real motives for market intervention. Yet the evidence summarized above shows some reform has been possible during the past two decades. Attempts to understand the political economy forces behind different countries' experiences at reform has begun (see, e.g., Anderson 2010, Rausser, Swinnen and Zusman 2011), but much political econometric work remains to be undertaken. More research is needed also on the political economy of biofuel policies, so as to understand how greater energy security and greenhouse gas emission reductions can be achieved in the large fuel-importing countries without having to resort to biofuel policies which are compromising global food security. A better understanding of public and private stockholding behaviour is required before optimal food stockholding policies can be devised. Would a coordinated regional rice storage agreement among Asian governments, for example, reduce their reluctance to engage more in the international rice market?



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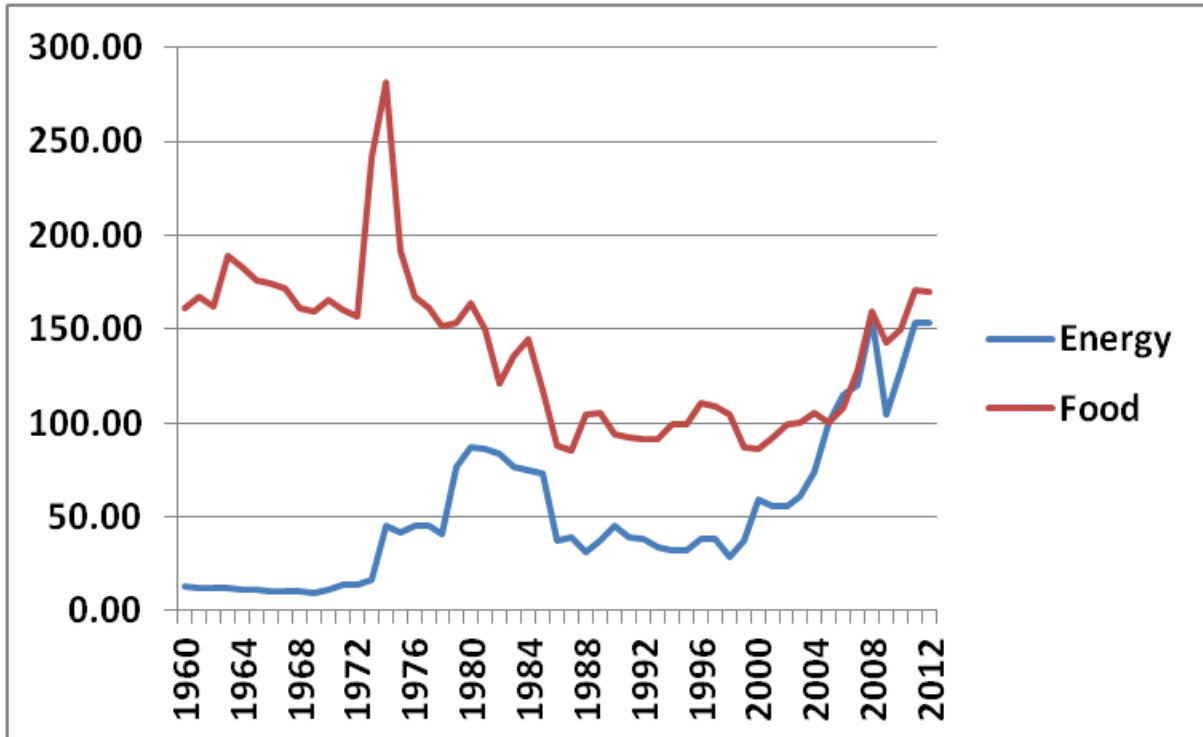
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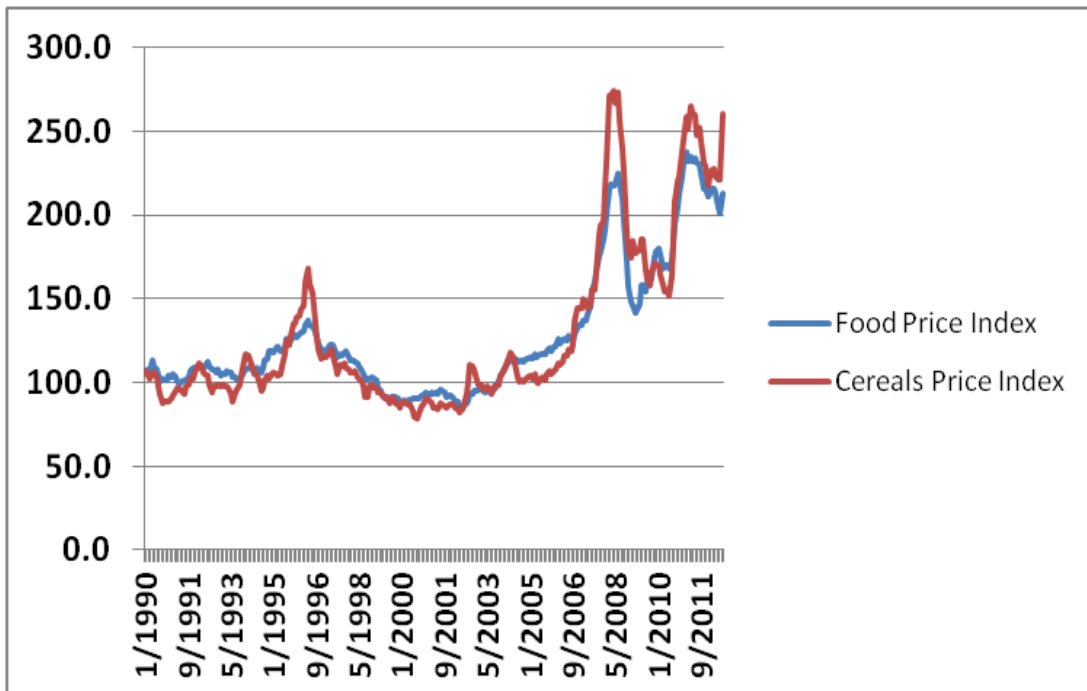
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Figure 1: Real<sup>a</sup> international food and fossil fuel price indexes, 1960 to July 2012  
 (constant US dollars, 2005 = 100)

(a) Annual data

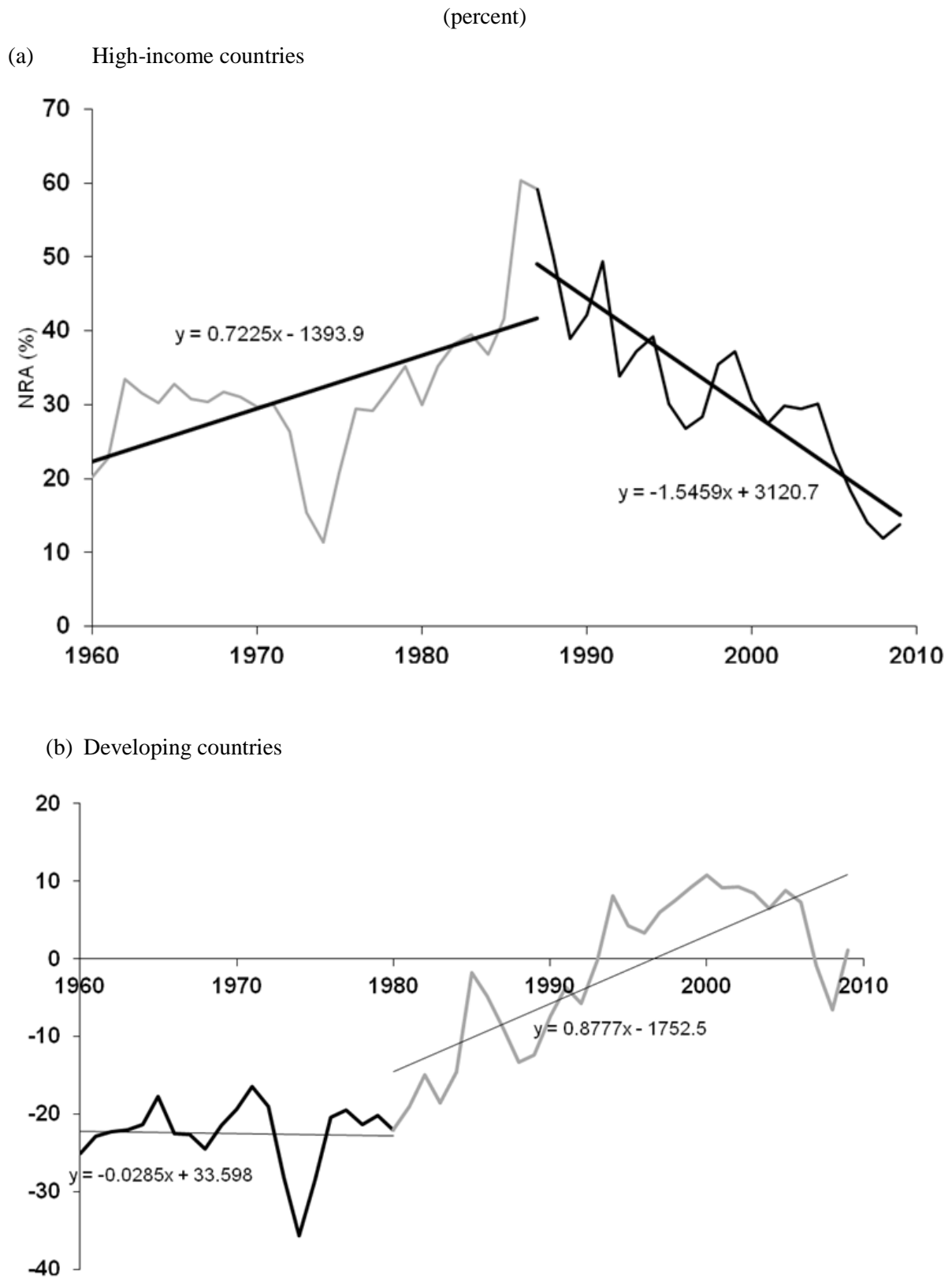


(b) Monthly data



Source: World Bank (2012)

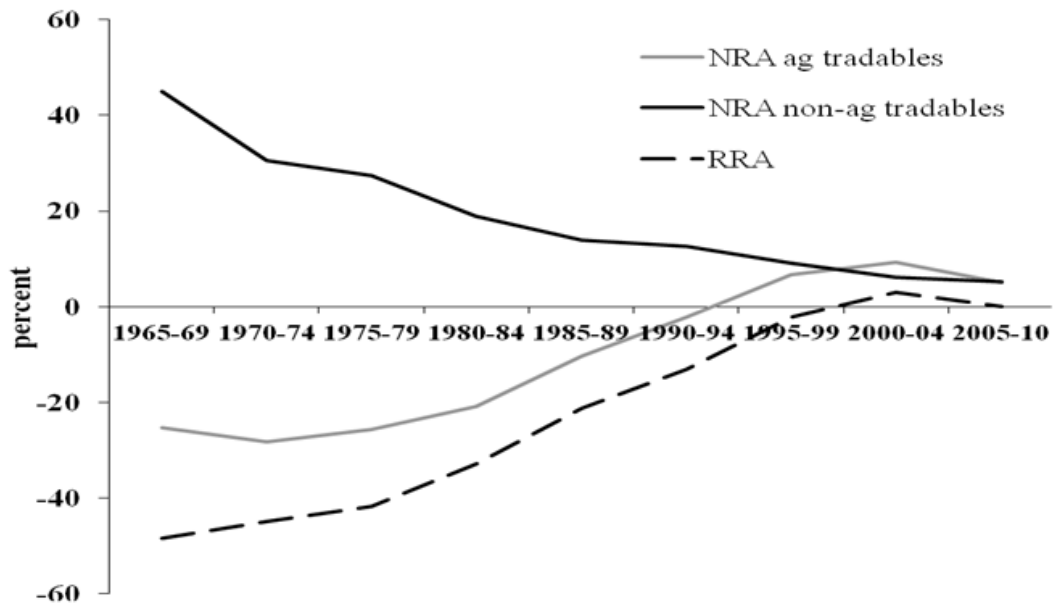
Figure 2: Nominal rates of assistance (NRAs) to farmers in high-income and developing countries, 1960 to 2009



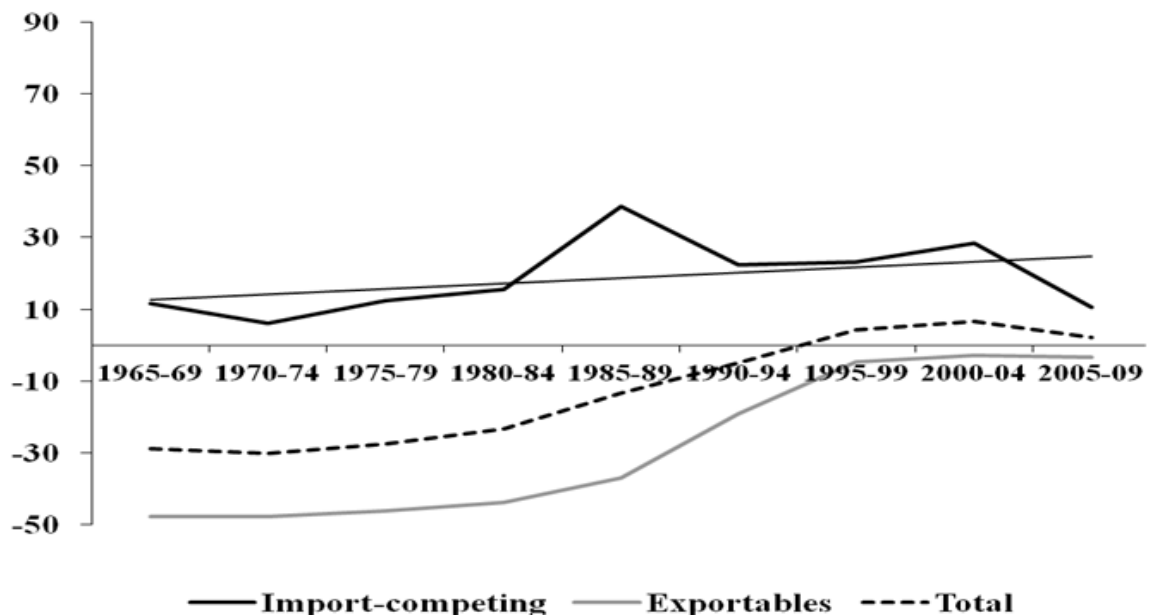
Source: Based on the update of NRA estimates in Anderson and Nelgen (2012b)

Figure 3: Nominal rate of assistance (NRA) to exporting, import-competing and all farmers, and to producers of non-farm tradable goods, developing countries, 1965 to 2009  
 (percent, five-year averages)

(a) NRA for farmers and producers of non-farm tradables, and relative rate of assistance<sup>a</sup>



(b) NRA for farmers, by trade status



<sup>a</sup> See footnote 2 for the formal definition of the relative rate of assistance

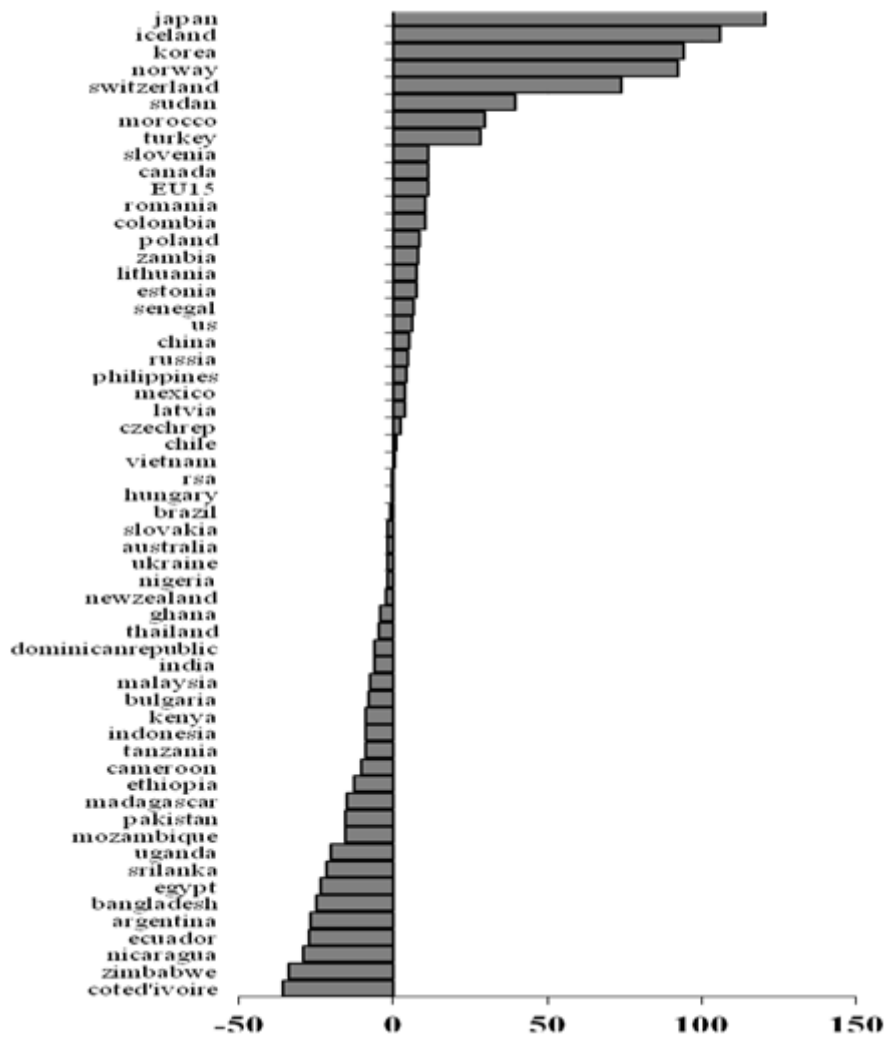
Source: Based on the update of NRA and RRA estimates in Anderson and Nelgen (2012b)

Figure 4: Relative rate of assistance to farmers (RRA),<sup>a</sup> by country, 2005-09



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(percent)

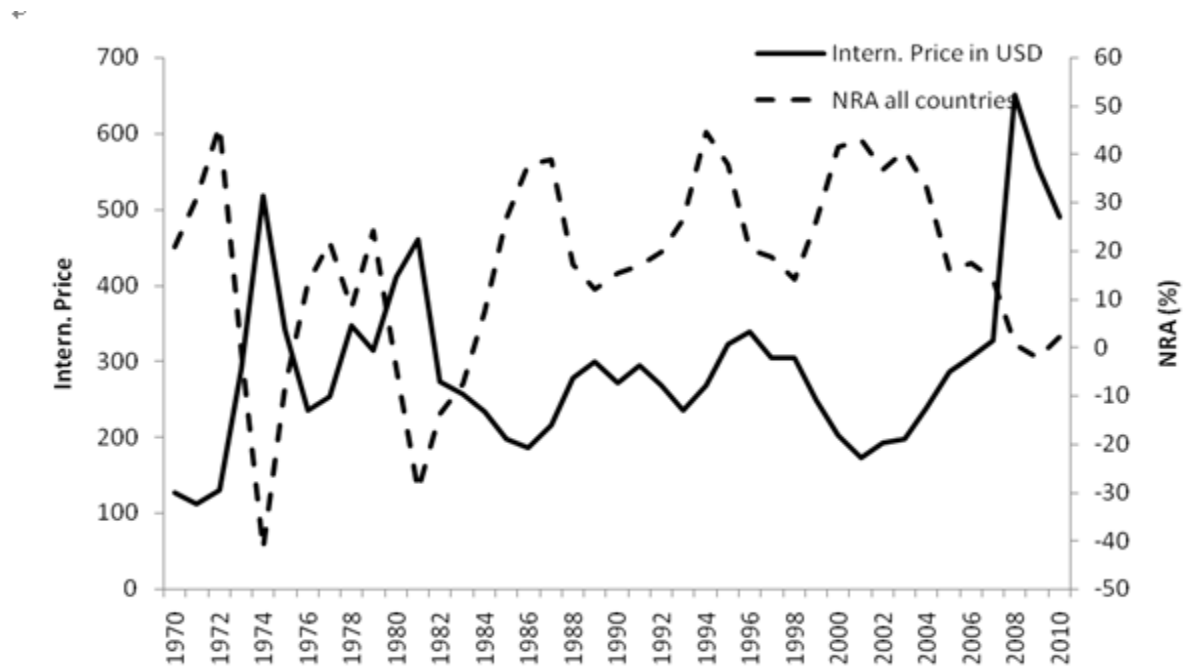


<sup>a</sup> See footnote 2 for the formal definition of the relative rate of assistance

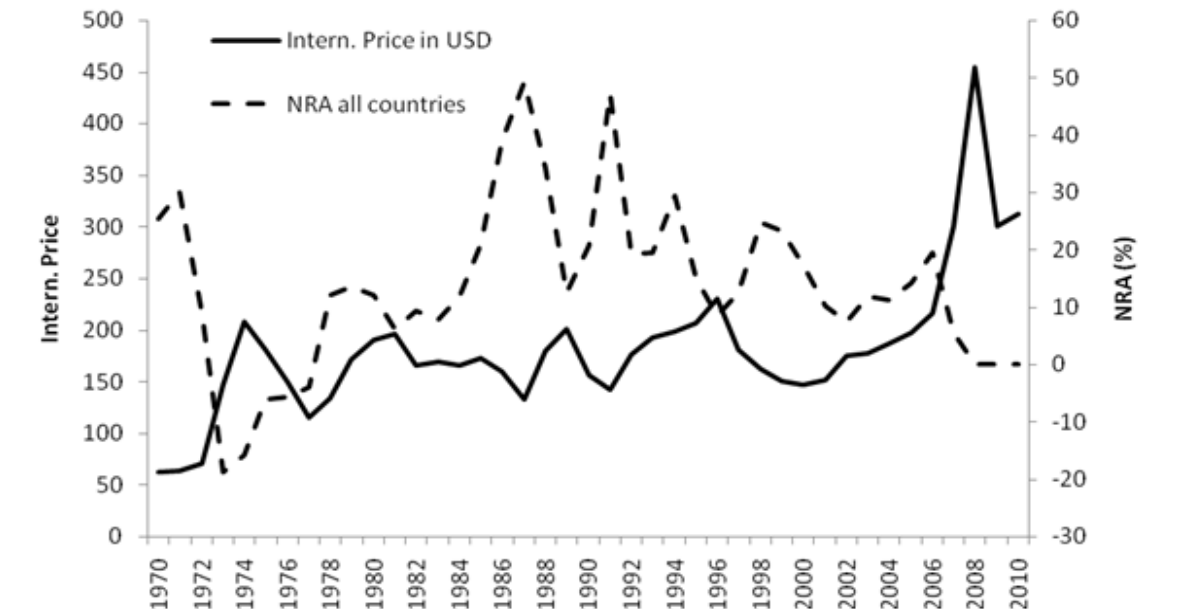
Source: Based on the update of RRA estimates in Anderson and Nelgen (2012b)

Figure 5: Rice and wheat NRAs and their international price, 82 countries,<sup>a</sup> 1970 to 2010  
 (left axis is international price in current US\$, right axis is weighted average NRA in percent)

(a) Rice

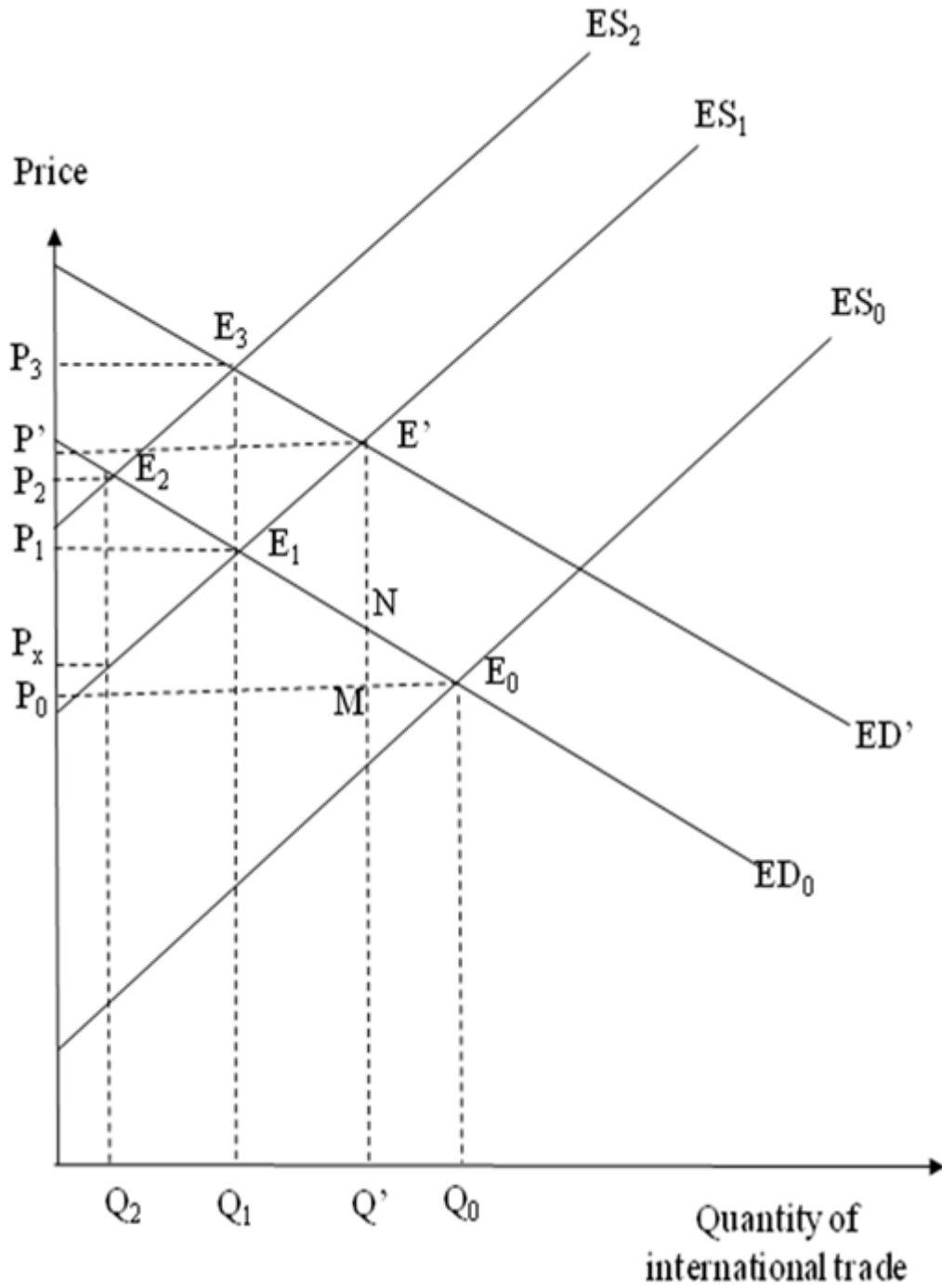


(b) Wheat



Source: Based on the update of NRA estimates in Anderson and Valenzuela (2008) by Anderson and Nelgen (2012b)

Figure 6: Effects of offsetting export barrier increases and import barrier reductions in the international market for food in response to an exogenous supply shock from  $ES_0$  to  $ES_1$



Source: Authorct of offset

**Table 1:** Deviation of national NRA around its trend value,<sup>a</sup> key farm products,<sup>b</sup> developing and high-income countries, 1965 value, creases and

(percent)

Deviation of national NRAs around trend <sup>a</sup>					Weighted average of NRAs (%)			
Developing countries		High-income countries			Developing countries		High-income countries	
	1965	1985	1965	1985	1965	1985	1965	1985
Rice	32	59	66	186	-20.1	0.9	136.8	351.8
Wheat	33	43	52	76	5.5	9.1	12.2	20.5
Maize	36	33	40	48	-3.4	2.3	6.9	11.9
Soybean	46	120	75	54	2.7	-2.1	0.1	5.2
Sugar	53	64	168	152	17.2	18.0	107.6	108.1
Cotton	38	32	42	30	-16.0	-2.7	21.3	10.4
Coconut	22	34	na	na	-11.5	1.2	na	na
Coffee	41	29	na	na	-37.3	-11.6	na	na
Beef	45	56	84	109	-12.4	2.6	22.7	37.9
Pork	81	58	73	69	23.6	-4.6	37.1	15.0
Poultry	109	69	91	175	26.3	11.8	24.5	25.4

<sup>a</sup> Deviation, measured in NRA percentage points, is computed as the absolute value of (residual and 1985s and import barrier reductions in the international market for food in response to an exogenous supply shock from ES-221) in May. ernmFAO (2003), T<sup>b</sup> Estimates shown are an unweighted average of national NRA deviations each year, averaged over the number of years in each period.

Source: Updated from Anderson and Nelgen (2012b).

**Table 2:** Global average short-run price transmission elasticities,<sup>a</sup> key foods, 1985 to 2010 (weighted average across all of the 82 countries for which NRAs are available, using value of national production at undistorted prices as weights)

Rice	0.49
Wheat	0.55
Maize	0.63
Soybean	0.73
Sugar	0.43
Milk	0.51
Beef	0.66
Pigmeat	0.51
Poultry	0.68
<b>Unweighted average, above nine products</b>	<b>0.56</b>

<sup>a</sup> The proportion of a change in the international price that is transmitted to the domestic market of a country within a year, estimated using Nerlove's linear regression of this distributed lag formulation.

Source: Estimated by Nelgen (2012) using data from Anderson and Nelgen (2012b)

Table 3: Contributions of policy-induced trade barrier changes to changes in the international prices of key agricultural products, 1972-74 and 2006-08

	<u>1972-74</u>	<u>2006-08</u>
<i>Consumption-weighted proportional decline in NAC, that is,- <math>\hat{T}^a</math></i>		
Rice	0.56	0.37
Wheat	0.30	0.12
Maize	0.21	0.08
<i>Proportional international price rise, <math>\hat{p}^*</math></i>		
Rice	3.00	1.13
Wheat	1.57	0.70
Maize	1.35	0.83
<i>Proportional contribution of changed trade restrictions to the international price change<sup>b</sup></i>		
Rice	0.27	0.40
Wheat	0.23	0.19
Maize	0.18	0.10

<sup>a</sup>  $\hat{T}$  is the negative of the weighted average of proportional changes in national NACs over the period, using national shares of global consumption valued at undistorted prices ( $G_i$ )'egative of the weighted average of propo<sup>b</sup>The proportional contribution of altered trade restrictions is  $\frac{\hat{T}}{\hat{T} + R}$ , where R is ional contribution of altered trade resthe equation  $\hat{p}^* = \hat{T} + R + (\hat{T} * R)$ , from which it follows that  $R = (\hat{p}^* - \hat{T})/(1 + \hat{T})$ .

Source: Anderson and Nelgen (2012a).

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Table 4: Contributions<sup>a</sup> of high-income and developing countries, and of importing and exporting countries, to the proportion of the international price change that is due to policy-induced trade barrier changes, 1972-74 and 2006-08

	<b>TOTAL PROPORTIONAL CONTRIBUTION</b>	High-income countries CONTRIBUTION	Developing countries CONTRIBUTION	Importing countries CONTRIBUTION	Exporting countries CONTRIBUTION
<b><u>1972-74</u></b>					
Rice	0.27	0.04	0.23	0.10	0.17
Wheat	0.23	0.15	0.08	0.18	0.05
Maize	0.18	0.14	0.04	0.06	0.12
<b><u>2006-08</u></b>					
Rice	0.40	0.02	0.38	0.18	0.22
Wheat	0.19	0.09	0.10	0.07	0.12
Maize	0.10	0.05	0.05	0.03	0.07

<sup>a</sup> Expressed such that the two numbers in each subsequent pair of columns add to the total proportion shown in column 1 of each row.

Source: Anderson and Nelgen (2012a), with the left column coming from bottom one-third of Table 2.

Table 5: Comparison of the domestic price rise with the rise in international grain prices net of the contribution of changed trade restrictions, rice, wheat and maize, 1972-74 and 2006-08

(percent, unweighted averages)

	International price rise		Domestic price rise		
	Including contribution of changed trade restrictions	Net of contribution of changed trade restrictions	All countries	Developing countries	High-income countries
<b><u>1972-74</u></b>					
Rice	300	220	59	72	27
Wheat	157	121	64	77	55
Maize	135	111	49	48	52
<b><u>2006-08</u></b>					
Rice	113	68	56	48	74
Wheat	70	56	77	65	81
Maize	83	75	73	62	82

Source: Anderson and Nelgen (2012a)

## Session 2

# Increase in Energy and Commodity Price and Volatility



### Presentation 2

## Suh Yong Chung

Professor at Korea University, Korea

Dr. Suh-Yong Chung is Associate Professor in the Division of International Studies and Director of Global Leadership Development Center at Korea University. Dr. Chung is an international expert on governance and institution building on various fields. His research covers emerging issues in the environment and sustainable development such as climate change, marine environment, biodiversity and nuclear security both at global and regional level. His most recent works focus on internationalization of Green Growth policy, post-2020 climate change regime formation, and regional environmental institution building in Northeast Asia, and nuclear security governance building.

Dr. Chung appeared in numerous international conferences and meetings hosted by various institutions including Stanford University, Harvard University, Fudan University, French Institute of International Relations (Ifri), Asia Foundation in Washington D.C. and ISIS Malaysia. He served the UN Basel Convention as a member of the Compliance Committee and has also participated in various activities of international organizations including the United Nations Industrial Development Organization (UNIDO) and UNDP/GEF Yellow Sea Large Marine Ecosystem Project. Most recently, Dr. Chung, as the Director of CSDLAP, organized the International Expert Series on Post-2012 Climate Change Regime Formation with the Global Green Growth Institute (GGGI). He is currently a listed Panelist under the Sustainable Development Chapter of Korea-EU FTA.

At the governmental level, he has also advised on international law and policy issues in Korea for the Ministry of Foreign Affairs and Trade, Ministry of Knowledge Economy, Ministry of Environment and the Organizing Committee of the 2012 Yeosu EXPO. Dr. Chung recently served the Presidential



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Committee on Green Growth as a Member.

Dr. Suh-Yong Chung holds degrees in law and international relations from Seoul National University, the London School of Economics and Stanford Law School

## G20's Role in Addressing Climate Change and Green Growth<sup>1</sup>

### **I. Introduction**

Since it became a summit level meeting in 2009, the G20 has played an important role in addressing global challenges among the major twenty economies. Due to rapid economic growth, advanced developing countries including China, India, South Africa, Mexico and Korea, have become major elements in shaping global economic as well as political landscapes. This is particularly so in the areas of climate change and other related issues. Under the limitations of the current UNFCCC process, the G20 has been regarded as an important forum where leaders could discuss on more tangible outcomes on how to enhance their level of ambitions to reduce GHG emissions, how to secure required financial sources, and implement climate change policies at the national level.

The G20 departed by recognizing already existing institutional efforts such as UNFCCC, and, Major Economies Forum and focusing on specific issues such as phasing out fossil subsidies. Its efforts in this regard have been widened in the Seoul meeting in 2010 by introducing the agenda of green growth. While green growth policy seems to be much related to the discussions on climate change, developments made within the G20 raise some issues such as how to make a clear linkage between climate change and green growth. This is particularly so if we consider the original advantages of the G20 in the context of fighting against climate change.

This paper first discusses the limitations of the current UNFCCC process to bring effective outcomes to tackle climate change. The problems of the top-down approach and dividing countries into two different groups of Annex I (developed countries) and non-Annex I (developing countries) are particularly emphasized. Then Chapter 3 argues that G20 may be a viable option to bring more effective results to address climate change (mitigation) problems as a soft and complementary forum. Then Chapter 4 discusses how the issues have been discussed and what has been achieved by G20. Although it would be also necessary to seek for a better policy direction for G20's effective and continuous contributions to this process, this paper leaves much of this issue beyond its scope of analysis.

### **II. Limitations of United Nations Framework Convention on Climate Change**

#### **1. Current Structure of UNFCCC Regime to Mitigate GHGs**

Since it was established in 1992, the United Nations Framework Convention on Climate Change

regime has tried to address climate change issues by introducing several schemes. Countries are divided into two different groups, so-called Annex I countries and non-Annex I countries, thereby giving different legally binding obligations to reduce GHGs according to their respective capabilities. On the other hand, when the Kyoto Protocol was introduced in 1997, it included an innovative approach of reducing GHGs by utilizing market mechanisms such as Clean Development Mechanism, Emission Trading Scheme and Joint Implementation.

#### *Top-Down Approach*

The UNFCCC along with its Kyoto Protocol has developed its scheme by dividing member countries into two different groups so that only developed countries bear legally binding obligations to reduce GHGs. Article 3 of Kyoto Protocol states as follows:

“1. The Parties included in Annex I shall, individually or jointly, ensure that their aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A do not exceed their assigned amounts, calculated pursuant to their quantified emission limitation and reduction commitments inscribed in Annex B and in accordance with the provisions of this Article, with a view to reducing their overall emissions of such gases by at least 5 per cent below 1990 levels in the commitment period 2008 to 2012.”

In other words, Annex I countries which are classified as Annex A countries under the Kyoto Protocol, have legally binding obligations of reducing GHGs by approximately 5 percent using the level of the 1990 as the baseline by 2012. Detailed amount of the emission reduction is prescribed by Annex B of the Kyoto Protocol. The non-Annex I countries, which are mostly developing countries, are not required by the Protocol to implement any legally binding obligations to reduce GHGs by 2012.

This two-track approach was based on the consideration of so called historical responsibility, and more specifically the common but differentiated responsibility principle. While countries have common responsibility for protecting the environment, they need to take into account of different circumstances, particularly each country's contribution to the evolution of a particular problem and its ability to prevent, reduce and control the threat.<sup>44</sup> When countries were in negotiation on how to divide them into different groups to reflect the CBDR, several different ideas were considered.<sup>45</sup> One of the examples is as follows:

“[...countries in accordance with their common but differentiated responsibility and capabilities

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<sup>44</sup> A CISDL Legal Brief (2002).

<sup>45</sup> Suh-Yong Chung, “Post-2012 Climate Change Regime Building: An Advanced Developing Country's Perspective,” presented at a seminar of GGGI International Expert Series on Post 2012 Climate Change Regime Formation (2011), pp. 2-4.

[and different time frames be set out for implementation with a view to achieving a common per capita emission level noting that the largest part of the current emission of greenhouse gases originated in developed countries and those countries [have the main responsibility for]/[should take the lead in] combating climate change and [the adverse effects thereof]/[such pollution]...”

Another option considered was:

“[There is a [global obligation]/[need] to protect the climate for the benefit of present and future generations based on principles of equity and common but differentiated responsibilities of countries. [In this context, the efforts already undertaken by a number of countries to meet this goal are acknowledged.]]”

In the end, countries agreed to the current Article 3 of the UNFCCC which states the details on the CBDR.

#### *Flexibility Mechanism*

As a complementary means to facilitate the efforts of the Annex I countries to implement their obligations under the UNFCCC regime, Kyoto Protocol introduced an innovative instrument based on market mechanisms. They are Emission Trading Scheme, Clean Development Mechanism and Joint Implementation. While this mechanism may promote sustainable development through technology transfer and investment towards the developing countries, these mechanisms may also assist Annex I parties in achieving their targets. It was the first attempt of the UNFCCC to address climate change by utilizing market principles. However this mechanism remains only complementary to the overarching top-down approach of the UNFCCC regime.

## 2. Negotiations on Post-2020 Climate Change Regime

As the UNFCCC and its Kyoto Protocol approach to the ending period of its first commitment period in 2012, countries started to initiate a negotiation process in 2007 in Bali, Indonesia. They agreed on the Bali Roadmap where the two-track approach was used to undertake the negotiations. Prior to 2007, Ad-hoc Working Group on Kyoto Protocol (AWG-KP) was created to discuss the legal obligations of Annex I countries after 2012, when the first commitment period ends. In addition to AWG-KP, Ad-hoc Working Group on Long-term Cooperative Action (AWG-LCA) was established to negotiate on the Post-2012 framework, particularly focusing on the enhanced mitigation action of the non-Annex I countries.

While it was initially planned to finish the negotiations by 2009 in Copenhagen, Denmark, member countries of the UNFCCC failed to agree on a new framework, which will be applied after year 2012. Instead, the negotiations produced a political agreement dubbed as the Copenhagen Accord

One of the main reasons for the UNFCCC's failure in sealing the negotiations was because of the unrealistic top-down approach that the UNFCCC and the Kyoto Protocol have relied on. Considering the fact that China and other major advanced developing countries have come to emit more GHGs than other Annex-I countries, it may not be appropriate only for Annex I countries to bear legally binding obligations to reduce GHG emissions.

In case of China, as of 2005, the amount of its GHG emissions already exceeded that of the US which has been regarded as the largest GHG emitter. And this trend is expected to be continued. In case of Korea, the country now ranks as the 9<sup>th</sup> largest emitters among the developed and developing countries. India was ranked as the third largest GHG emitter as of 2005 and is expected as the largest emitter in year 2030.

**Table 1. Selected Statics for China and the United States in 2005**

	China	United States
Population (millions)	1305	297
Population Growth (annual %)	0.6	1.0
GDP (billions USD)	2,244	12,398
GNI using purchasing power parities (USD)	5,359	12,359
GNI per capita (USD)	4,110	41,680
GDP growth (%)	10.4	3.2
Energy Consumption per Capita	1,316	7,893

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(kg oil equivalent per capita)		
Electricity Consumption per Capita (kWh per capita)	1,718	13,698
Greenhouse Gas Emissions (metric tons CO <sub>2</sub> e)	1,718	13,698
Greenhouse Gas Emission per Capita (metric tons per capita)	6	25
Greenhouse Gas Emission per GNI (tons per 1000 USD GNI, using purchasing power parities)	1.4	0.6

*Source: CRS Report for Congress (2008)*

In terms of the GHG emission projection in the future, amount of GHG emissions by the developed countries will be decreased. However, advanced developing countries will be likely to continue to increase their GHG emissions.

Under this situation, voices asking advanced developing countries to take more responsibility to reduce GHGs have gained more supports. Combining emission amount of non-Annex I countries including China, India, Korea, Mexico, Indonesia, Brazil, and South Africa could be more than total emission of Annex I countries. Unless we find a way of ensuring significant emission reduction by these non Annex I countries to reduce GHGs, it would be impossible to meet the recommendation of the IPCC to meet the 2 degree target.

### 3. Need for Alternative Approach

In fact, most of the advanced developing countries have already started to curb their GHG emissions on their own. Koreaed more supports. Combining emission amount of non-Annex I countr to tackle environmental challenges such as climate change, Korea made a progressive step forward by declaring its voluntary GHG reduction target by 30 percent relative to BAU by 2020. Korea believes that this voluntary commitment based on its national legislation can help to push itself to invest into new engine of growth. Investments in renewable technologies and other clean technologies along with other policy plans have helped Korea to maintain its economy relatively well compared with other advanced economies such as Europe.

In the climate change negotiation context, Koreas have already started to curb their GHG emissions on their own. Koreaed more supports. Combining emission amount of non-Annex I countr to tackle environmental challenges such as clnce by the industries and other stakeholders, voluntary bottom-up approach of Korea has demonstrated a good example of how to raise the level of ambition of non-Annex I countries to share the responsibility to protect the environment.

Furthermore, it is vital to find out how to overcome the limitations of the UNFCCC which is based on

the two track approach, i.e. Annex I vs. non Annex I. Embedded sovereign interests of advanced developing countries by linking themselves to the group of non-Annex I do not allow them to take international pressures to become Annex I countries. Political consideration overweighs the simple economic calculation.

### **III. G20 as a Viable Option for Climate Change Mitigation Efforts**

The UNFCCC viable Option for Climate Change Mitigation Efforts is one of the situations of the UNFCCC which is based on the two track approach, i.e. Annex I vs. non Annex I. Embedded sovereign interests of advanced developing countries by linking themselves to the Meeting (which later became the Major Economies Forum), the World Economic Forum and the G20.<sup>46</sup>

In case of G20, it has some advantages to deal with climate change issues. First and most important advantage is small membership. The twenty countries which represent more than 80 percent of the total GHG emissions can help to avoid unnecessary political debates. In the UNFCCC process, participation of many countries have hampered agreeing on the issues as diversified political considerations need to be considered. In other words, although climate change mitigation issues require only small number of the member countries which emit significant amount of GHGs, the consensus based UNFCCC process has not been able to exclude those small countries for efficient dialogue.

Second, G20 as an informal body rather than as a decision making body, has played its role in encouraging dialogue among industrialized countries and emerging markets. Different from the UNFCCC process, the G20 has an informal nature and does not make any legally binding agreements. This may facilitate leaders of 20 countries to have an open dialogue and to increase the possibility of identifying mutual grounds.

Third, G20 has played a complementary role in addressing climate change. According to Kim and Chung (2012), the G20 convenes an informal yet intense high level forum. Both the APP and MEF aim for clean technology development by seeking a private-public partnership and global partnership, respectively, whereas, G20 has focused on a different set of climate change issues such as financing, fossil fuel subsidies, green growth and a broader engagement with stakeholders by issue specific coalition. As a result, “the G20 and other climate change governing organizations could be mutually reinforcing by addressing diverse issues related to climate change solutions and delivering different functions.”

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<sup>46</sup> Joy Aeree Kim & Suh-Yong Chung, “The role of the G20 in governing the climate change regime,” *International Environmental Agreements: Economics, Law and Politics* (2012, May).

#### IV. Developments of G20's Efforts to Address Climate Change

Since twenty leaders started to meet in London in 2009, issues related to climate change have been discussed by the summits in various ways.

##### *Climate Financing*

Climate change started to be dealt with by G20 as a matter of financing issue. At the London Summit in 2009, summits discussed climate change focusing on the financing aspect of the issues. For example, leaders stated:

We agreed to make the best possible use of investment funded by fiscal stimulus programs towards the goal of building a resilient, sustainable, and green recovery. We will make the transition towards clean, innovative, resource efficient, low carbon technologies and infrastructure.

In other words, leaders agreed to develop green stimulus package which naturally require investments into related green technologies and infrastructure. They also wanted to make a linkage between the G20 process and the UNFCCC process by emphasizing the necessity of reaching an agreement at the UN Climate Change Conference in Copenhagen in 2009.

This effort demonstrates how the leaders of G20 wanted to utilize the G20 process as a complementary one to that of the UNFCCC process by mobilizing their political wills to support the UNFCCC process as well as by helping address financing aspect of climate change mindful of G20 is mainly a forum for financial policy.

This effort of G20 regarding climate financing was furthered by its later meetings. In Pittsburgh meeting in 2009, leaders recognized their continuous commitment to the climate financing by noting the outcome of the Major Economies Forum in L'Aquila, Italy, i.e. agreement to establish "a Global Partnership to drive transformational low-carbon, climate-friendly technologies" and to increase public and private investments in research, development and demonstration of those technologies. In November 2009, financial ministers made more detailed plans on the climate change financing options and committed to continue their work on climate change financing

In Cannes in 2011, leaders continued to emphasize the necessity to fight against climate change. While they supported efforts to make a success in Durban Conference on Climate Change, they urged to implement the Cancun agreements and further progress in all areas of negotiation including the



operationalization of the Green Climate Fund as a balanced outcome in Durban. It is also noteworthy that leaders further to make linkages between the G20 and the UNFCCC in the aspect of climate financing by asking finance ministers to continue their work in the climate finance field, taking into account the objectives, provisions and principles of the UNFCCC.

This effort led to Mexico Summit Meeting emphasize the necessity to fight against climate change. While they supported efforts to make a success in Durban Conference on Climate Change, they urged to the issues on Green Climate Fund in particular.

### *Energy Subsidies*

G20 also tries to tackle energy subsidies as the fossil fuel subsidies result in a new negative effect at both the individual at global levels. One study conducted by the International Institute for Sustainable Development (IISD) found that large fuel subsidy reform would result in aggregate increase in GDP in both OECD and non-OECD countries. The expected increase ranged from 0.1 percent in total by 2010 to 0.7 percent per year to 2050.”

Based on this understanding, leaders have supported to phase out fossil fuel subsidies in their meetings including ones in Pittsburg, Seoul, Cannes and Mexico.

### *Green Growth*

Since the Seoul Summit Meeting, leaders started to discuss on the issues of green growth. While it could be much closely related to the discussions on climate change, G20 seems to be not sure how to deal with issues of green growth and climate change. According to the Seoul Summit Document for Framework for Strong, Sustainable and Balanced Growth, G20 started to recognize the importance of green growth policy that promote environmentally sustainable global growth along with employment creation while ensuring energy access for the poor. To that end, it emphasizes “enabling environments that are conducive to the development and deployment of energy efficiency and clean energy technologies including policies and practices in the [member] countries and beyond, including technical transfer and capacity building.” While it was noteworthy that green growth issues were addressed as a part of broad context of climate change, it was not completely clear how the leaders perceive the green growth policy in the context of climate change.

The Cannes Meeting in 2011 puts less emphasis on climate change and green growth issues. Global economic difficulties seem to be blamed for the less emphasis on the issues of climate change and related green growth issues. However, in the Mexico Meeting in 2012, leaders under the leadership of

Mexico paid more attention to the issues of green growth. It seems they started to integrate the agenda on green growth into the UNFCCC and Rio+ 20 processes. In order to address the concerns over the narrow scope of green growth, which might focus more on the mitigation aspect of the climate change issues, leaders emphasized that green growth is not exclusive but rather inclusive in a sense of taking care not only of issues directly concerned with the members of G20, but also issues related to the other developing countries. In order to effectively implement this goal, leaders also agreed to establish the Development Working Group and welcomed the international efforts in launching the Green Growth Knowledge Platform. They also continue to explore options to provide prescriptive, voluntary toolkit of policy options for inclusive green growth. However, it is not entirely clear as to what extent could current G20 efforts bring tangible results to address climate change issues. Considering the advantages of G20, which includes small but major GHG emitters and is based on a consensus-building process, widening the scope of its works related to climate change by developing the concept of inclusive green growth might deviate the group from its original focus. Therefore, much more fine tuned policy design is necessary for the leaders to address this concern in order to achieve the goals of tackling climate change as well as realizing green growth as a matter of implementation of the climate change policies at the national level.

## Session 2

# Increase in Energy and Commodity Price and Volatility



### Presentation 3

## Kyong Wook Choi

Professor at University of Seoul, Korea

Kyongwook Choi is a professor at the School of Economics at the University of Seoul. He received his education at Korea University, Seoul, Korea, where he received his Bachelor and Master of Arts degrees in Economics. He worked for the Bank of Korea, the central bank of Korea, as an economist for four years. To pursue more advanced economics training he studied further in the United States. In 2002, he earned a Doctor of Philosophy degree at the University of Washington, Seattle, Washington in Economics. He taught at Ohio University, Athens, Ohio (2002-2007) as an assistant professor. He has published numerous articles in economic journals, including *The Journal of International Money and Finance*, *Journal of Empirical Finance*, *the Energy Journal*, *Energy Policy* and more.

## Session 2

# Increase in Energy and Commodity Price and Volatility



### Presentation 3

## Dong Heon Kim

Professor at Korea University, Korea

Dong Heon Kim started to work as Assistant Professor in the Department of Economics at the Korea University February 1, 2006 and currently Professor in the department. He was the Lecturer in the School of Economics at the University of Manchester from October 1 2000 to October 31 2006.

Professor Kim has over 12 years of professional experience as an academic scholar, and an evaluator for management of government institutes. He taught at the University of California at San Diego and worked at a Co-Editor in the *Manchester School*, a well-known international economic journal, from 2005 to 2009. He also worked as a team-leader of evaluation committee for the government institutes.

Professor Kim has published numerous reviewed journal articles in English and Korean, especially on topics relating to the term structure of interest rates, monetary policy, oil shocks, and business cycle.

Professor Kim, obtained his Ph.D. in Economics from the University of California at San Diego and his Master's and Bachelor degrees in Economics from Korea University in Seoul.

## The Analysis on the Effect of Commodity Price Volatility on G-20 Economies

### **Abstract:**

Since 2003, commodity price surge and increased commodity price volatility have been important policy challenge among G20 countries. This study examines empirical relationship between commodity price volatility and G20 macroeconomy focusing on the role of commodity price uncertainty. For this end, we employ a structural GARCH-in-mean VAR model which captures the effect of commodity price volatility on economic activity. We find that volatility in commodity price has had a negative effect on aggregate output. Our result suggests that policies coping with volatility not only in the short run but also in the long run need to be warranted in line with improvements in the conduct of macroeconomic policy, and better management of resource income volatility.

JEL codes: E32; C32; F01

Key words: Commodity price volatility, G20 economies, Uncertainty, multivariate GARCH-in-mean VAR

## I. Introduction

As over the past decade, commodity prices not only surged but also these prices had become more volatile, commodity price volatility was one of concerning issues in the G20 summit in October 2011 and still is ongoing issue. Substantial commodity price volatility presents important policy challenge to policymakers nationwide as well as worldwide, because very volatile commodity prices create pronounced planning uncertainty and a risk of capital misallocation and consequently dampen economic growth. From this point of view, supporting the proper functioning of global commodity markets is a policy priority and domestic policy measures are needed to compromise global commodity market prospective.

Existing literature has shown that volatility may have a negative impact at the macroeconomic level on growth and poverty, which are the most damaging in poor countries. Examples include Aizenman and Marion (1993), Ramey and Ramey (1995), and Rodrick (1999). Aizenman and Pinto (2005) argue that higher volatility leads to an economic crisis. Bernanke (1983) argues that uncertainty about the return to investment at the firm level may create cyclical fluctuations in aggregate investment. Elder and Serletis (2010) find that volatility in oil prices has had a negative and statistically significant effect on aggregate output. Cavalcanti, Mohaddes, and Raissi (2011) show that the negative growth effects of commodity terms of trade volatility offset the positive impact of commodity booms and argue that volatility, rather than abundance, drives the “resource curse” paradox.<sup>47</sup> From agricultural commodity price volatility, Huchet-Bourdon (2011) argues that the recent spike in price volatility is rather transitory.

Why does commodity price volatility matter? Very volatile commodity prices can create pronounced planning uncertainty and a risk of capital misallocation and such uncertainty curtails investment and affects capacity utilization and therefore has a significant negative effect on growth. In this study, we examine empirical relationship between commodity price volatility and G20 economies. Specifically, we focus on the effect of commodity price uncertainty on G20 economic growth. Methodologically, we employ a structural GARCH-in-mean VAR which captures the direct effects of commodity price uncertainty on real economic activity in an internally consistent fashion. Elder and Serletis (2010) show that this model is very useful for studying the relationship between oil price uncertainty and real economic activity. From the empirical study for 17 countries among G20, our principal result is that commodity price volatility has a negative effect on output growth and both energy and non-energy commodity price volatility matter. Our study suggests that as outlined in FAO et al. (2011) and G20-report (2011), policies coping with volatility in the short run such as buffer

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<sup>47</sup> Resource curse paradox means that despite the potentially beneficial impact of natural resource wealth on economic prosperity, natural-resource abundant economies tend to grow at a slower pace and thus over the last two centuries, countries rich in natural resources experienced growth of comparatively low or mediocre magnitude. For resource curse paradox, see Sachs and Warner (1995) and Papyrakis and Gerlagh (2003).

stocks, emergency food reserves, international and national safety nets, and coping with volatility in the long run such as market-based mechanisms to protect producers against price and other risks need to be warranted in line with improvements in the conduct of macroeconomic policy, and better management of resource income volatility through sovereign wealth funds (SWF) as well as stabilization funds.

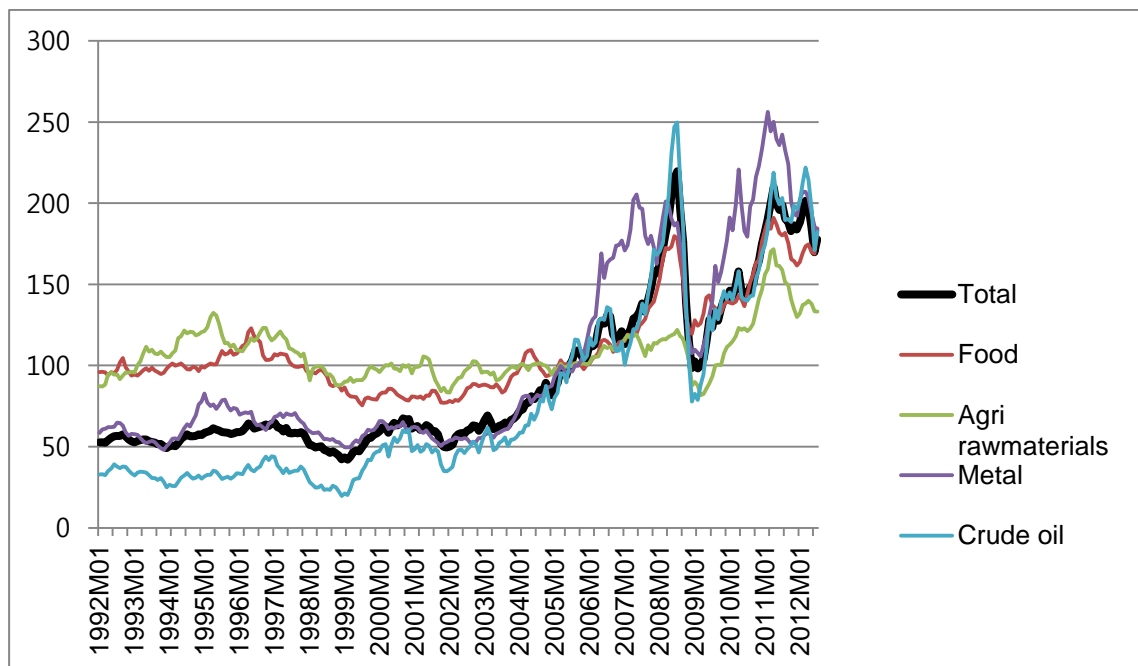
The paper is organized as follows. Section II provides a brief description of the understanding of recent commodity price surge and its outlook. Section III describes methodology for empirical study and Section IV presents the data and the result of empirical study. Concluding remarks along with policy implications for this study are provided in Section V.

## II. Understanding of recent commodity price movement

### 1. A general outlook

Before studying commodity price volatility, a preliminary examination of commodity price levels may provide a general outlook for recent commodity market. The past decade was characterized by large fluctuations in commodity prices. Figure 1 shows the evolution of IMF commodity price indices. The commodity prices started to rise with the global economy recovery in 2003 and peaked in the mid 2008, and fell sharply due to global financial crisis. Since early 2009, prices have been rising again. The main drivers of changes in aggregate commodity prices have been Energy and metals. For instance, crude oil prices increased more than double from end-2007 until August 2008, then dropped by almost 70% until the end of 2008, and have risen by almost 150% since then.

[ Figure 1 ] IMF indices of primary commodity prices



Source: IMF, International Financial Statistics

Figure 2 plots S&P GSCI and its sub-indices. The commodity price surge clearly appears since early 2009 and the speed of the rise seems to accelerate since the fall of 2010. The recent price surge is led by energy and agricultural commodities. Specifically, agriculture commodity prices increased sharply in July and August 2012 and these commodity price movements bring about deep concern on food crisis which occurred in 2008 and 2010-2011.

[ Figure 2 ] Global commodity prices: S&P GSCI and its sub-indices

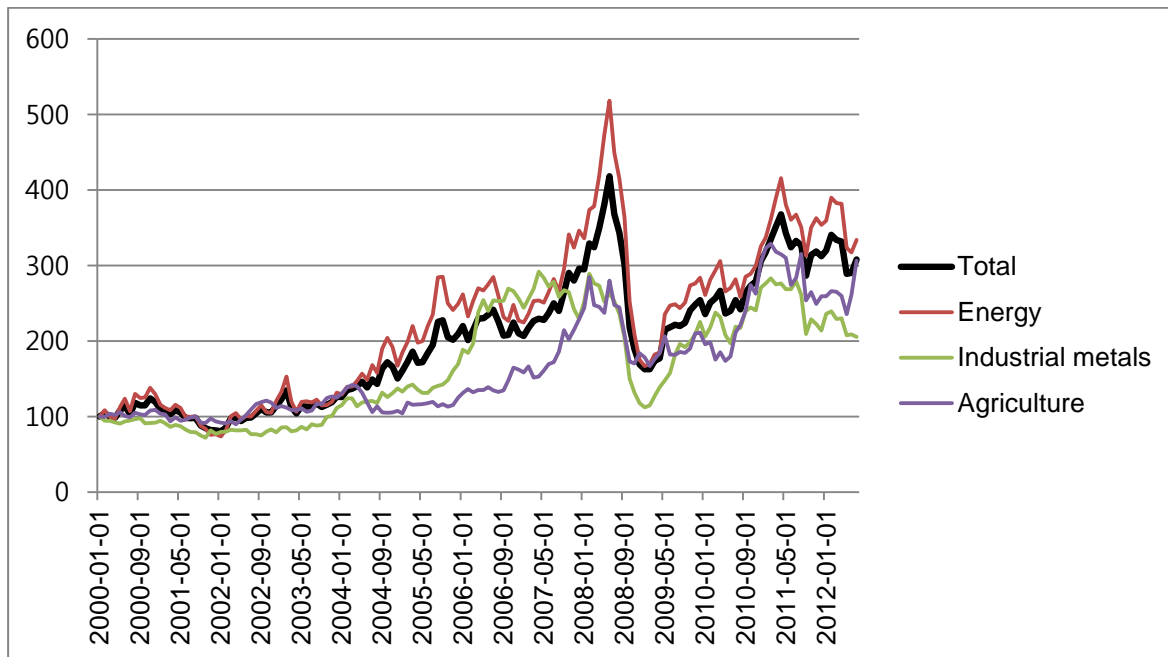
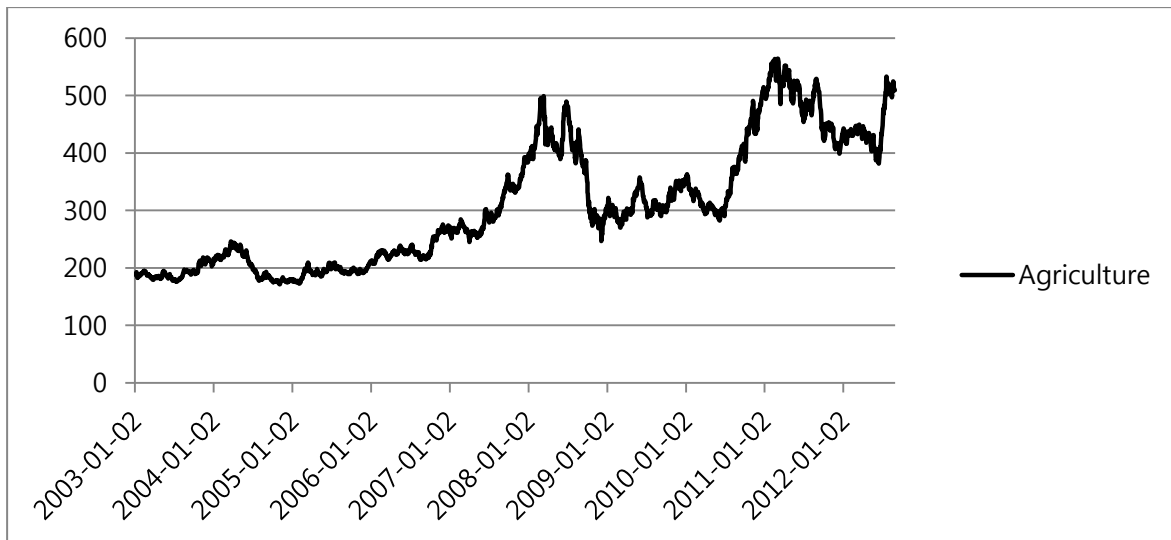


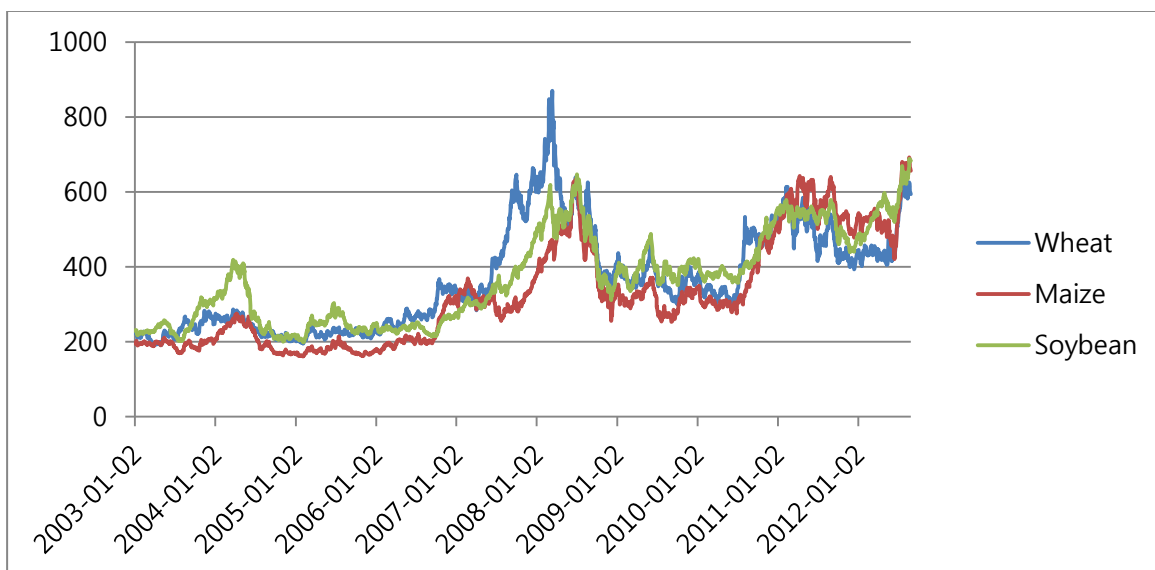
Figure 3.1 and 3.2 show S&P GSCI agricultural index and its sub-indices for primary agricultural commodity prices: wheat, maize, and soybean. One may notice that since the global recovery in 2003, the agricultural commodity price surged three times: the first half of 2008, the second half of 2010, and the middle of 2012. The S&P GSCI agricultural index increased about 34% over July and August 2012. Among agricultural commodities, the prices of wheat, maize and soybean rose about 45%, 38%, and 24% respectively over same periods. The market analysts report that main reasons for recent agricultural commodity price surge are deteriorating supply condition due to severe droughts and growing participation of financial investors in commodity markets.



[ Figure 3.1] Agricultural commodity prices: Total



[ Figure 3.2] Agricultural commodity prices: Wheat, Maize, Soybean

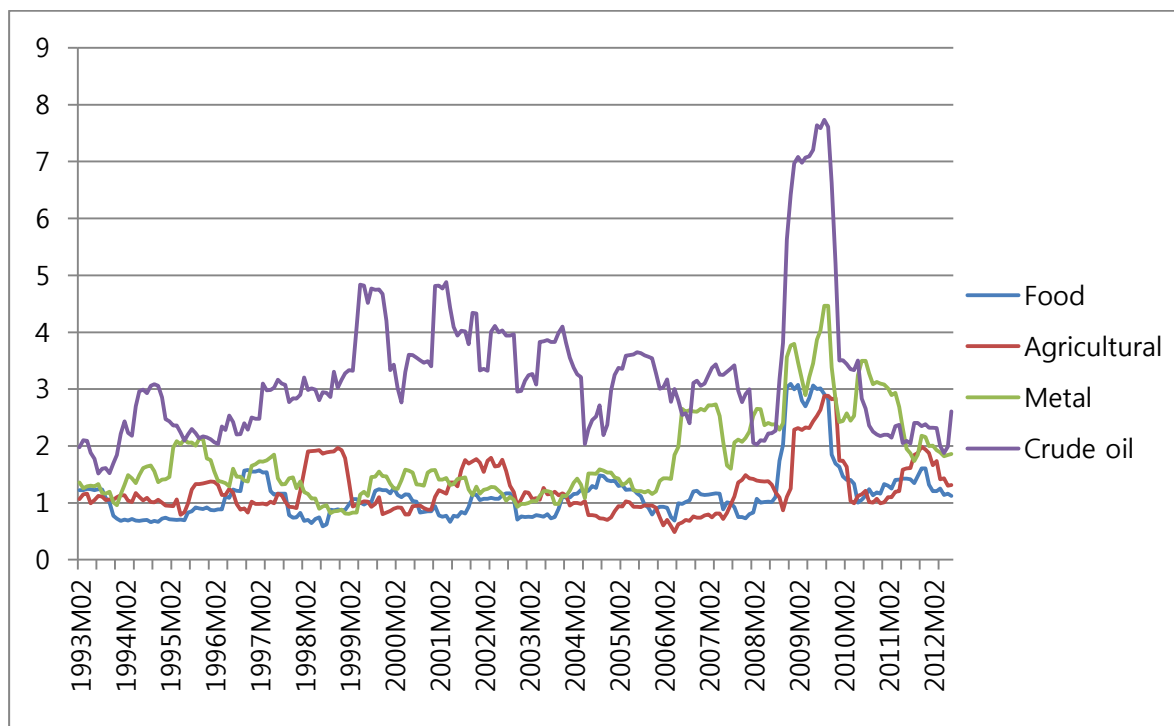


Source: Bloomberg

The large swings in commodity prices since 2003 have been associated with increased short-term volatility. When prices move along a well-established and expected trend reflecting market fundamentals, price variation is not problematic but when they are large and cannot be anticipated and as a result, create a level of uncertainty, variations in prices become problematic. Such uncertainty can result in higher risks for producers, traders, consumers, and governments. Consequently, variations in prices that do not reflect market fundamentals can lead to incorrect decisions and sub-optimal decisions. Figure 4 shows historical volatilities calculated from percent change of IMF commodity

indices over specified sample periods<sup>48</sup>.

[ Figure 4] Commodity price volatility



Source: IMF

Since early 2009 all commodity price volatilities increased rapidly and fell in early 2011. The volatility of crude oil price, however, increased sharply again in the mid 2012. Although recent trends in the price level and volatility of major commodity groups appear less unusual in a long term perspective, what seems to be different from earlier commodity price cycles is the large amplitude of price swings for a broad range of commodities. From the Figure 4, one may notice that for some commodities, the speed and amplitude of recent price swings have been large and the subsequent cyclical contraction was very deep and intense for most commodity groups.

## 2. The causes of recent surge in commodity prices

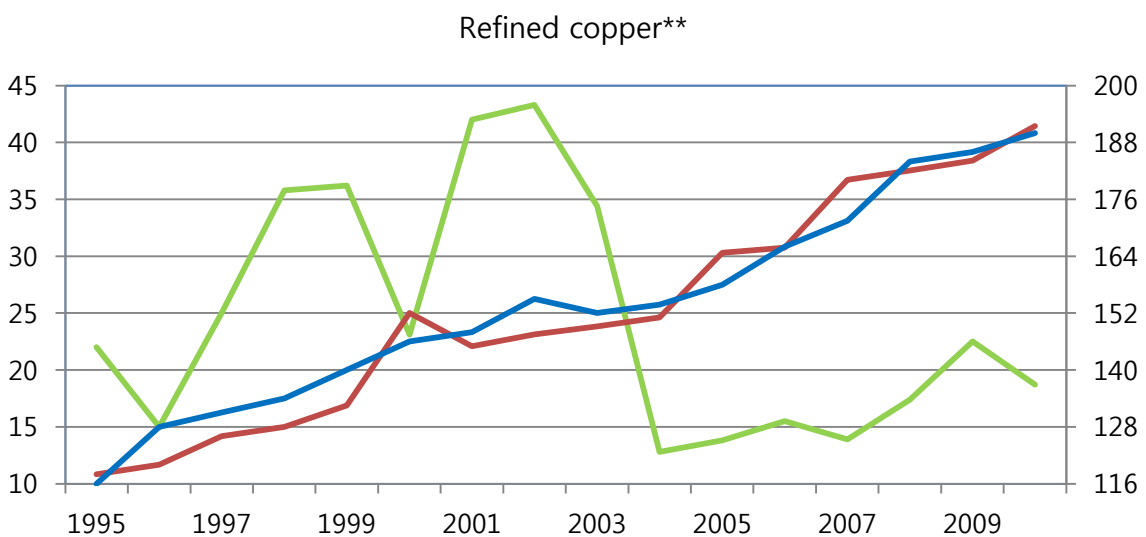
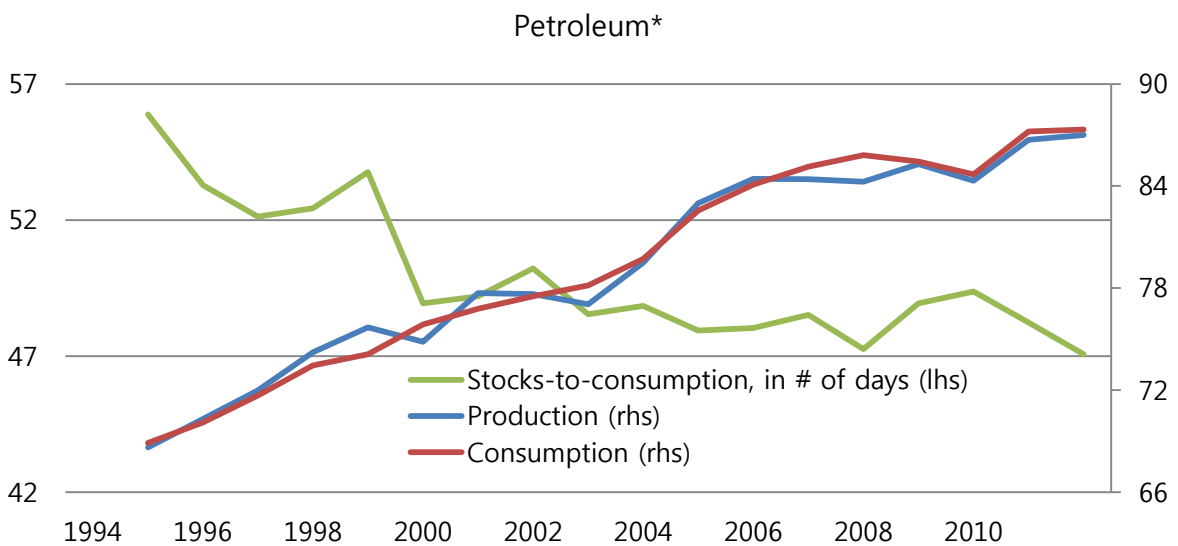
Although there is no consensus on which factor dominates the rise in commodity prices, FAO et al. (2011), G20-report (2011), Inamura et al. (2011), and Kawamoto et al. (2011) provide following factors for the background behind the surge in commodity prices. First of all, there has been a growing physical demand for commodities. Figure 5 shows supply, consumption and stocks of selected commodities. Global demand for energy, food and industrial metals has risen rapidly but disruptions to

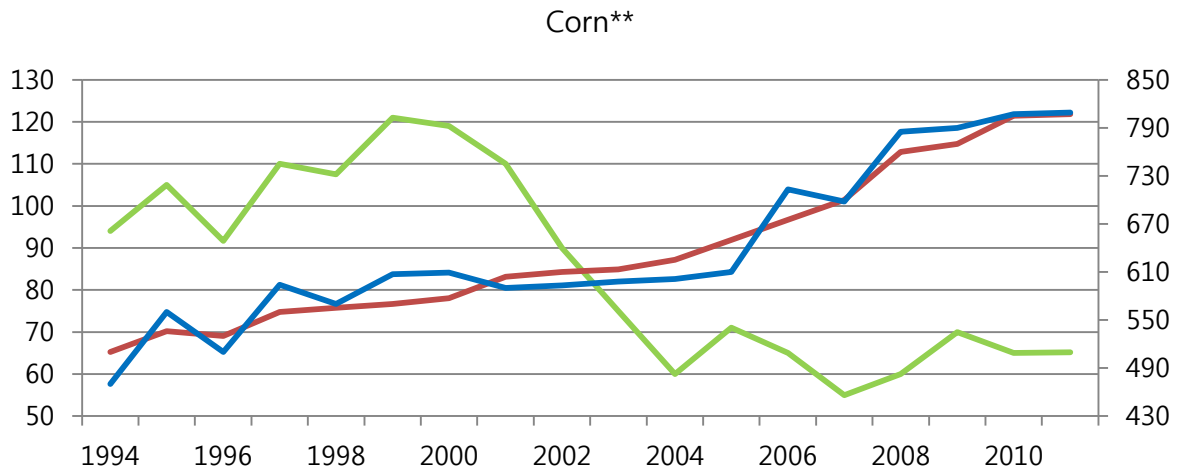
<sup>48</sup> The historical volatility is calculated as rolling one-year standard deviation of monthly commodity return over the specified sample periods.

oil supply, droughts and floods have had a negative impact on supply of commodities and as a consequence, global stock levels for many commodities were lower in 2010 than before.

G20-report (2011) points out that real commodity prices have moved roughly in tandem with the global economic cycle. As the global economy experienced robust recovery since 2003, the worldwide demand for commodities has increased, in particular with rising demand for commodities in emerging countries such as China and India. The report explains that buoyant commodity demand generating from emerging market economies reflects two related factors: (1) output grew much faster in emerging market economies than in advanced economies in the past decade; (2) rapid emerging market economy growth has been relatively commodity intensive.

[ Figure 5] Commodity demand and supply



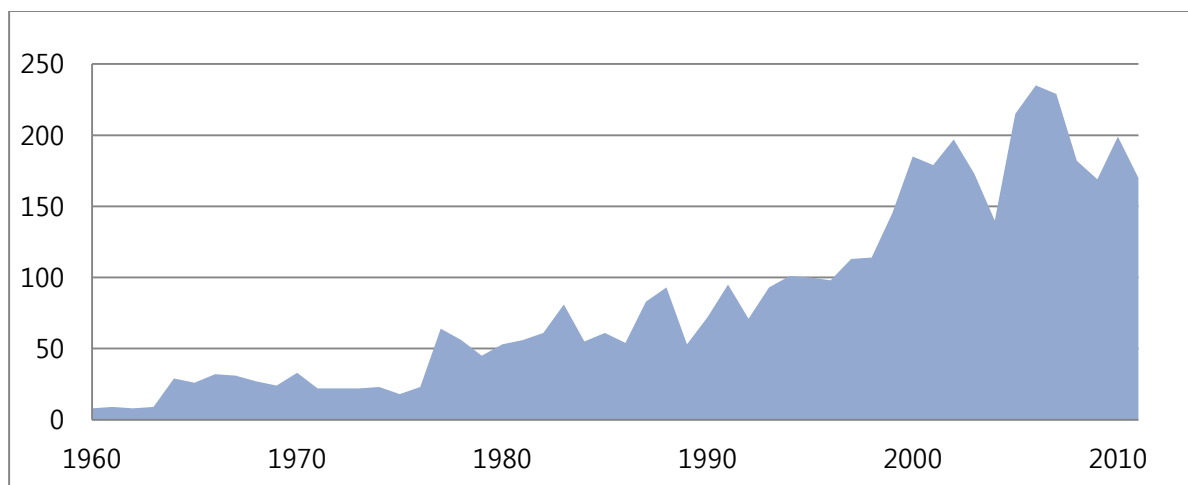


Source: Bloomberg, Energy Information Administration, Reprinted from G-20(2011)

Note: \* Supply and consumption in millions of barrels per day; stock in billions of barrels \*\*Millions of metric tons

Secondly, supply constraints such as adverse weather and geopolitical risks, have put upward pressures on commodity prices. Climate-related supply disruptions have had a growing impact on food supply due to more frequent climate changes and geopolitical concerns in the Middle East or geographic concentration of natural resources can affect market structure adversely and thus supply. Figure 6 clearly indicates more frequent occurrences in the case of extreme climate changes in 2000s. In addition, G20-report (2011) states that investment in exploration and production was in many cases low in the years prior to the commodities price boom because of the prolonged period of low commodity price in the 1990s and rising costs of commodity production and energy production have constrained supply growth.

[ Figure 6] Reported climate changes: droughts, floods, and extreme temperature



Source: International Disaster Database (EM-DAT), reprinted from G20-report (2011)

Note: Number of reported occurrences of droughts, floods and extreme temperature

Thirdly, the speculative investments by growing participants of financial investors in commodity markets have been widely seen as a factor driving up recent commodity price surge. G20 report (2011) indicates that the estimated market value of commodity-related assets under management has grown significantly since 2005 and has reached more than 410 billion USD in the first quarter of 2011, comparing with nearly 270 billion USD when commodity prices peaked in mid-2008. Growing participation of financial investors suggests that commodity price may become more sensitive to their decisions and position-taking. Two related mechanisms that can cause commodity prices to deviate from values consistent with fundamentals (supply-demand conditions) are suggested in the literature. First of all, it is market imbalances caused by financial inflow or outflows that are very large relative to the market. For example, increases in liquidity or balance sheet constraints facing financial investors, and swings in risk appetite of investors can trigger changes in their financial positions. Another is investors' herding behavior which means that investors just follow price movements.<sup>49</sup>

Whether the growing presence of financial investors has a significant impact on the functioning of commodity market or not is ongoing debate and there is insufficient evidence to admit general consensus. Masters (2008), Mayer (2009, 2011), Singleton (2011), Tang and Xiong (2010), and Kawamoto et al. (2011) consider significant impact of financialization of commodities markets on commodity prices while IMF (2008), Irwin and Sanders (2010), Hamilton (2009), Kilian and Hicks (2009), and Korniotis (2009) show that speculative forces do not play an important role in the commodity market fundamentals.

Fourthly, global accommodative monetary conditions have been cited as a driving factor of commodity prices. The extended low interest rate policies in the United States and other advanced countries have stimulated investment flows into commodity markets and growing physical demand for commodities propelled by the high economic growth of emerging countries and their monetary easing have been the main contributor to a rise in commodity prices. Thus, global accommodative monetary conditions both in advanced and emerging countries affect the rise in commodity prices.

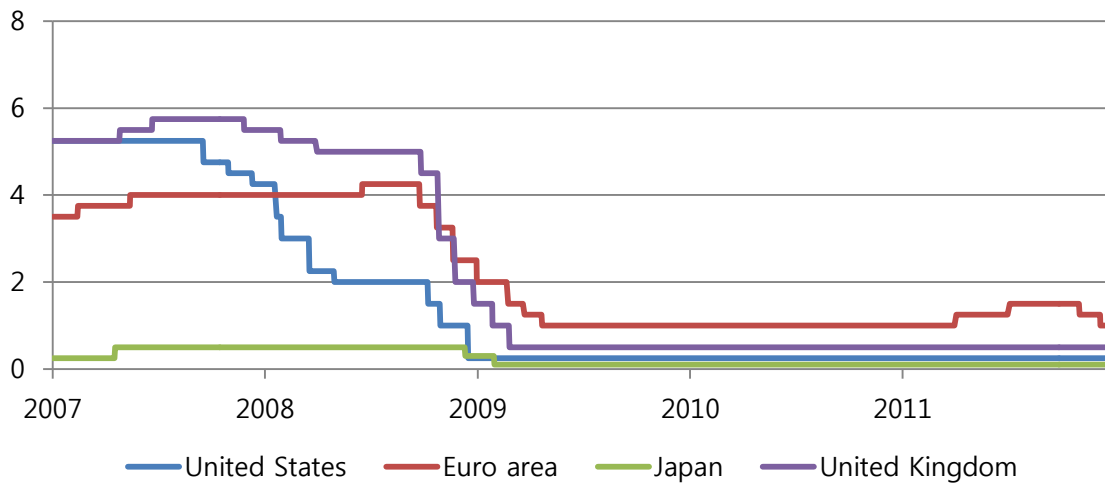
Figure 7 shows policy interest rates of major advanced economies and emerging market economies and policy interest rates in both economies have been low. Anzuini, Lombardi and Pagano (2010) find empirical evidence of a significant impact of the US monetary policy on commodity prices. Kawamoto et al. (2011) confirm the quantitative evidence on the impact of global monetary policy on commodity prices.

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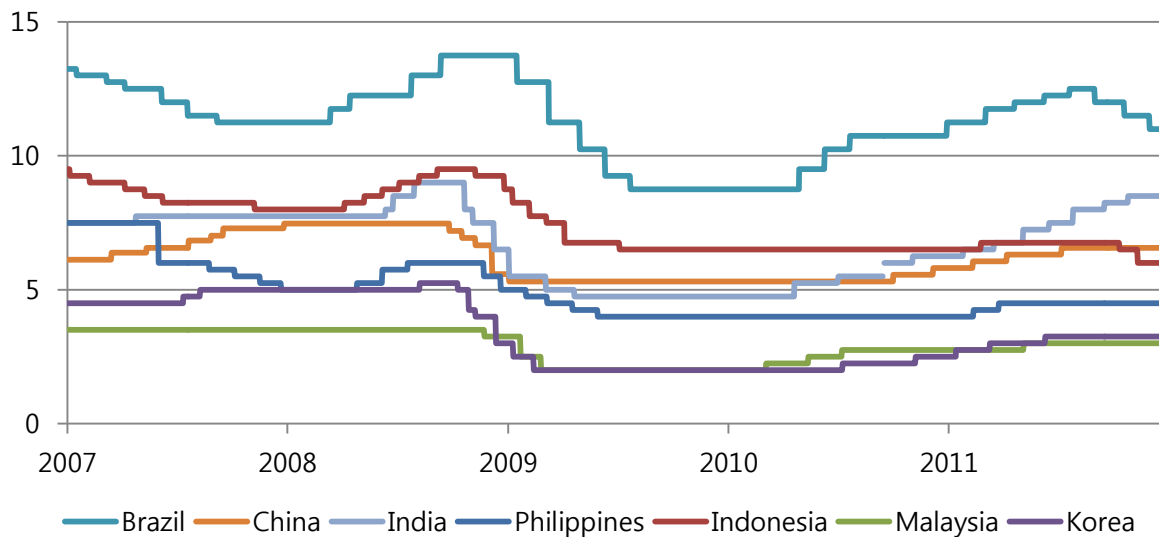
<sup>49</sup> From empirical studies about U.S. futures markets, Boyd et al. (2010) find that the moderate levels of herding by hedge funds serve to stabilize, rather than destabilize, prices in future markets.

[ Figure 7 ] Policy interest rates

[Major advanced economies]



[Emerging market economies]



Source: Bloomberg, national data, reprinted from G20 report (2011)

In sum, the causes of the recent global commodity price surge appear to (1) growing demand for commodities, (2) adverse supply shocks, (3) financialization of commodity markets and (4) global monetary expansions. In terms of policy implications, depending on which factors matter for the recent commodity boom and on how ones identify the empirical effects of each factor, one may consider desirable policy responses.

### III. Methodology

As shown in Bernanke (1983), Lee, Ni, and Ratti (1995), and Elder and Serletis (2010), increase in volatility can induce uncertainty about future decision and such uncertainty may create

cyclical fluctuation in aggregate economy. From this point of view, higher commodity price volatility may result in uncertainty about commodity prices and such uncertainty may have direct impact on the real economy. Specifically, increased uncertainty about the commodity price will tend to delay the decision to investment and thus uncertainty may diminish the willingness of individual commodity firms to commit resources to investment. In addition, uncertainty about energy prices may cause energy-intensive manufacturers to delay decisions on whether to commit resources to the development of new products. Therefore, uncertainty about commodity price may have a direct impact on aggregate economy.

To examine the effect of commodity price uncertainty on real economic activity, we employ structural GARCH-in-mean VAR model proposed in Elder and Serletis (2010), where uncertainty is measured as the standard deviation of the one-step-ahead forecast error, conditional on the contemporaneous information set and this conditional variance affects the conditional mean. More specifically, we consider the dynamics of the structural system of commodity price and real economic activity as follows:

$$\mathbf{B}\mathbf{y}_t = \mathbf{K} + \Phi_1\mathbf{y}_{t-1} + \dots + \Phi_p\mathbf{y}_{t-p} + \Gamma(\mathbf{L})\mathbf{H}_t^{1/2} + \boldsymbol{\varepsilon}_t, \quad (1)$$

where  $\dim(\mathbf{B}) = \dim(\Phi_i) = (N \times N)$ ,  $\boldsymbol{\varepsilon}_t | \Omega_{t-1} \sim iid N(\mathbf{0}, \mathbf{H}_t)$ ,  $\mathbf{H}_t^{1/2}$  is diagonal,  $\Gamma(\mathbf{L})$  is a matrix polynomial in the lag operator, and  $\Omega_{t-1}$  denotes the information set at time  $t - 1$ . In our application,  $\mathbf{y}_t$  vector includes two variables, output growth and the change in the commodity price.

One can identify the system by imposing a sufficient number of restrictions on the matrix  $\mathbf{B}$  and by assuming that the structural disturbances,  $\boldsymbol{\varepsilon}_t$ , are uncorrelated. In the model (1), the matrix of conditional standard deviations,  $\mathbf{H}_t^{1/2}$ , can affect the conditional mean. In our application of this model, we test whether commodity price volatility affects real economic activity via a test of restrictions on the elements of  $\Gamma(\mathbf{L})$  that relate the conditional standard deviation of commodity prices, given by the appropriate element of  $\mathbf{H}_t^{1/2}$ , to the conditional mean of  $\mathbf{y}_t$ . If commodity price volatility has adversely affected output growth, then we would expect to find a negative and statistically significant coefficient on the conditional standard deviation of commodity price in the output equation.<sup>50</sup>

Following Engle and Kroner (1995), the conditional variance  $\mathbf{H}_t$  is modeled as bivariate GARCH:

$$\mathbf{h}_t = \boldsymbol{\omega} + \sum_{j=1}^J \boldsymbol{\alpha}_j \text{vec}(\boldsymbol{\varepsilon}_{t-j} \boldsymbol{\varepsilon}'_{t-j}) + \sum_{i=1}^I \boldsymbol{\beta}_i \mathbf{h}_{t-i}, \quad (2)$$

<sup>50</sup> Elder (2004) also provides an impulse response function based on the GARCH-in-Mean VAR model. An impulse response function of the standard VAR model and GARCH-in-Mean VAR has different structure because the shock of the interest variable shows evidence of the GARCH effect, and thus the estimating method should be different from the standard (homoscedastic) VAR impulse response estimation

$\boldsymbol{\varepsilon}_t = \mathbf{H}_t^{1/2} \mathbf{u}_t; \mathbf{u}_t \sim iid N(\mathbf{0}, \mathbf{I})$ , where  $\boldsymbol{\omega}$  is  $N^2 \times 1$ ,  $\boldsymbol{\alpha}_j$  &  $\boldsymbol{\beta}_i$  are  $N^2 \times N^2$ , and  $\mathbf{h}_t = vec(\mathbf{H}_t)$ .

Given the zero contemporaneous correlation of structural disturbances, the conditional variance matrix  $\mathbf{H}_t$  is then diagonal and redimensioning the variance function parameter matrices  $\boldsymbol{\omega}, \boldsymbol{\alpha},$  &  $\boldsymbol{\beta}$ , the variance function can be rewritten as follows:

$$diag(\mathbf{h}_t) = \boldsymbol{\omega} + \sum_{j=1}^J \boldsymbol{\alpha}_j diag(\boldsymbol{\varepsilon}_{t-j} \boldsymbol{\varepsilon}'_{t-j}) + \sum_{i=1}^I \boldsymbol{\beta}_i diag(\mathbf{H}_{t-i}), \quad (3)$$

where *diag* is the operator that extracts the diagonal from a square matrix. Following Elder and Serletis (2010), we impose the additional restriction that the conditional variance of  $y_{i,t}$  depends only on its own past squared errors and its own past conditional variances, and so the parameter matrices  $\boldsymbol{\alpha}_j$  &  $\boldsymbol{\beta}_i$  are also diagonal. Furthermore, we consider only the case with  $J = I = 1$ , which is the specification of GARCH (1,1) in the univariate GARCH case. The system of the equations (1) and (3) is the bivariate GARCH-in-mean VAR and can be estimated by full information maximum likelihood (FIML).

#### IV. Empirical analysis

##### 1. Data and unit root test

The data in the empirical study is monthly industrial production, consumer price index (CPI), and energy and non-energy commodity prices for G20 countries. The data is available on the IFS data set (IMF). Since the data availability is different over the countries, the sample period is different for each country.

The results from applying the ADF and Phillips-Perron tests to G20 industrial production, consumer price index, percentage changes in industrial production, and inflation rate data are reported in Table 1 through Table 4. On the basis of applying the ADF test to each series in levels of industrial production data, most of the series cannot reject the null of non-stationarity. When only a constant term is included in the ADF test regression model, all countries' industrial productions are apparently non-stationary. However, when we use the constant and trend term in the ADF test regression, some countries' industrial production appears to be a stationary variable. For example, the industrial production data of Brazil, Germany, and Indonesia reject the null hypothesis of non-stationarity at the conventional 5% level. The Phillips-Perron tests generally confirm the results of the ADF test except for that of Turkey's. When taking the log difference of the industrial production, the results show that all countries' percentage changes in industrial productions are stationary in Table 2. In Table 3, a consumer price index for each country shows clear non-stationary behavior because none of the test



results can reject the null hypothesis of non-stationarity. Table 4 shows that the inflation rate data from the consumer price index is stationary except for Canada, France, Italy, South Africa, Turkey, U.K., and the U.S., all of which fall under this exception when utilizing the ADF test. However, when we use the Phillips-Perron test, all countries' inflation rate data appear to be stationary variables. We report the ADF and Phillips-Perron test results for energy and non-energy commodity prices in Table 5. For each commodity variable, the null hypothesis of non-stationary is not rejected in the level unless one includes constant and trend in the ADF regression. We confirm that the log difference of each commodity price is stationary from both tests.

**[Table 1] Unit Root Tests: Industrial Production**

	ADF Test		Phillips-Perron Test	
	Constant	Constant+Trend	Constant	Constant+Trend
Argentina (Jan/1973~ Nov/2010)	-1.456 (16)	-0.836 (16)	-1.411 (14)	-2.575 (14)
Brazil (Jan/1991~ Apr/2012)	-1.150 (0)	-3.792 <sup>b</sup> (0)	-1.16 (2)	-4.135 <sup>a</sup> (5)
Canada (Jan/1957~ Mar/2012)	0.346 (12)	-2.043 (12)	0.600 (13)	-2.021 (13)
France (Jan/1956~ Mar/2012)	-2.420 (2)	-0.937 (2)	-2.265 (7)	-1.34 (9)
Germany (Jan/1958~ Apr/2012)	-1.133 (4)	-4.055 <sup>a</sup> (4)	-1.060 (12)	-3.968 <sup>b</sup> (13)
India (Jan/1964~ Mar/2012)	4.797 (18)	2.316 (18)	6.037 (11)	1.338 (9)
Indonesia (Dec/1996~ Mar/2012)	-2.442 (12)	-3.605 <sup>b</sup> (13)	-2.554 (6)	-7.759 <sup>a</sup> (3)
Italy (Jan/1953~ Apr/2012)	-2.009 (6)	-0.716 (6)	-2.084 (15)	-0.354 (15)
Japan (Jan/1953~ Apr/2012)	-1.642 (17)	-0.749 (17)	-1.451 (12)	-1.391 (13)
Korea (Jan/1957~ Apr/2012)	5.247 (18)	1.613 (18)	3.770 (9)	0.226 (8)
Mexico (Jan/1980~ Mar/2012)	-0.400 (4)	-3.205 (4)	-0.195 (11)	-2.699 (11)
Russia (Jan/1995~ Mar/2012)	-1.043 (11)	-1.516 (11)	-1.080 (3)	-1.631 (3)
Saudi Arabia (May/1964~May/2012)	-2.556 (18)	-2.607 (18)	-2.638 (5)	-2.912 (7)
South Africa (Jan/1961~ Mar/2012)	-1.733 (14)	-2.349 (14)	-1.601 (11)	-2.622 (2)
Turkey (Jan/1985~ Mar/2012)	0.351 (14)	-2.247 (14)	-0.361 (12)	-6.969 <sup>a</sup> (11)
United Kingdom (Jan/1956~ Apr/2012)	-1.933 (8)	-0.941 (8)	-1.922 (4)	-0.588 (2)
United States (Jan/1950~ Apr/2012)	-0.033 (4)	-2.860 (4)	-0.117 (17)	-2.388 (17)

Note: We use non-durable manufacturing, petroleum and coal products, crude petroleum products for Argentina and Saudi Arabia, and manufacturing for Indonesia and South Africa. The lag length was set by AIC on every occasion. Note that a) rejects the null hypothesis at the 1% level, b) rejects the null hypothesis at the 5% level, and c) rejects the null hypothesis at the 10% level.

**[Table 2] Unit Root Tests: Percentage changes in Industrial Production**

	ADF Test		Phillips-Perron Test	
	Constant	Constant+Trend	Constant	Constant+Trend
Argentina	-4.212 <sup>a</sup> (14)	-4.411 <sup>a</sup> (14)	-46.725 <sup>a</sup> (3)	-44.887 <sup>a</sup> (2)
Brazil	-5.935 <sup>a</sup> (13)	-5.936 <sup>a</sup> (13)	-16.302 <sup>a</sup> (3)	-16.283 <sup>a</sup> (3)
Canada	-6.856 <sup>a</sup> (12)	-7.153 <sup>a</sup> (12)	-30.529 <sup>a</sup> (14)	-30.551 <sup>a</sup> (14)
France	-19.867 <sup>a</sup> (2)	-20.308 <sup>a</sup> (2)	-34.873 <sup>a</sup> (10)	-37.478 <sup>a</sup> (16)
Germany	-13.258 <sup>a</sup> (2)	-13.400 <sup>a</sup> (2)	-33.103 <sup>a</sup> (13)	-33.272 <sup>a</sup> (13)
India	-9.868 <sup>a</sup> (7)	-10.065 <sup>a</sup> (7)	-45.500 <sup>a</sup> (14)	-46.607 <sup>a</sup> (16)
Indonesia	-3.640 <sup>a</sup> (13)	-4.028 <sup>a</sup> (13)	-29.856 <sup>a</sup> (16)	-31.071 <sup>a</sup> (17)
Italy	-8.990 <sup>a</sup> (5)	-8.361 <sup>a</sup> (13)	-34.112 <sup>a</sup> (15)	-35.777 <sup>a</sup> (12)
Japan	-5.502 <sup>a</sup> (16)	-7.144 <sup>a</sup> (16)	-26.966 <sup>a</sup> (16)	-26.744 <sup>a</sup> (15)
Korea	-17.864 <sup>a</sup> (1)	-18.22 <sup>a</sup> (1)	-30.351 <sup>a</sup> (9)	-30.914 <sup>a</sup> (6)
Mexico	-6.542 <sup>a</sup> (9)	-6.540 <sup>a</sup> (9)	-22.049 <sup>a</sup> (12)	-22.03 <sup>a</sup> (12)
Russia	-4.714 <sup>a</sup> (10)	-4.768 <sup>a</sup> (10)	-15.221 <sup>a</sup> (4)	-15.281 <sup>a</sup> (3)
Saudi Arabia	-5.927 <sup>a</sup> (17)	-6.056 <sup>a</sup> (17)	-32.345 <sup>a</sup> (10)	-32.506 <sup>a</sup> (10)
South Africa	-5.382 <sup>a</sup> (14)	-6.254 <sup>a</sup> (15)	-44.396 <sup>a</sup> (4)	-45.223 <sup>a</sup> (3)
Turkey	-6.404 <sup>a</sup> (14)	-6.405 <sup>a</sup> (14)	-45.441 <sup>a</sup> (20)	-45.513 <sup>a</sup> (20)
United Kingdom	-21.304 <sup>a</sup> (1)	-21.524 <sup>a</sup> (1)	-31.279 <sup>a</sup> (4)	-31.253 <sup>a</sup> (0)
United States	-8.922 <sup>a</sup> (12)	-9.100 <sup>a</sup> (12)	-18.678 <sup>a</sup> (9)	-18.704 <sup>a</sup> (8)

Note: We use non-durable manufacturing, petroleum and coal products, crude petroleum products for Argentina and Saudi Arabia, and manufacturing for Indonesia and South Africa. The lag length was set by AIC on every occasion. Note that a) rejects the null hypothesis at the 1% level, b) rejects the null hypothesis at the 5% level, and c) rejects the null hypothesis at the 10% level.

[Table 3] Unit Root Tests: CPI

	ADF Test		Phillips-Perron Test	
	Constant	Constant+Trend	Constant	Constant+Trend
Argentina (Jan/1957~Apr/2012)	2.486 (18)	0.506 (18)	<b>4.582</b> <b>(19)</b>	<b>1.215</b> <b>(19)</b>
Brazil (Dec/1979~May/2012)	1.234 (2)	-2.111 (2)	<b>1.453</b> <b>(13)</b>	<b>-2.038</b> <b>(12)</b>
Canada (Jan/1957~Apr/2012)	0.695 (19)	-2.609 (19)	<b>2.498</b> <b>(11)</b>	<b>-3.192<sup>c</sup></b> <b>(9)</b>
France (Jan/1957~May/2012)	-0.107 (18)	-2.693 (18)	<b>0.808</b> <b>(19)</b>	<b>-1.776</b> <b>(19)</b>
Germany (Jan/1991~ May/2012)	0.02 (12)	-2.919 (12)	<b>-1.751</b> <b>(5)</b>	<b>-3.62<sup>b</sup></b> <b>(5)</b>
India (Jan/1957~Apr/2012Apr)	4.639 (19)	3.425 (19)	<b>11.92</b> <b>(14)</b>	<b>5.503</b> <b>(14)</b>
Indonesia (Jan/1968~ May/2012)	3.541 (13)	0.329 (13)	<b>4.913</b> <b>(13)</b>	<b>0.394</b> <b>(13)</b>
Italy (Jan/1957~ May/2012)	0.777 (15)	-2.614 (15)	<b>2.882</b> <b>(19)</b>	<b>-3.321<sup>c</sup></b> <b>(18)</b>
Japan (Jan/1957~ Apr/2012)	-1.84 (14)	-0.618 (14)	<b>-2.028</b> <b>(18)</b>	<b>0.825</b> <b>(17)</b>
Korea (Jan/1970~ Apr/2012)	0.924 (14)	-3.062 (14)	<b>2.826</b> <b>(0)</b>	<b>-2.697</b> <b>(0)</b>
Mexico (Jan/1957~ May/2012)	1.403 (16)	-0.763 (16)	<b>5.097</b> <b>(16)</b>	<b>-0.041</b> <b>(15)</b>
Russia (Jan/1992~ Apr/2012)	1.528 (14)	-2.414 (14)	<b>2.949</b> <b>(9)</b>	<b>-2.673</b> <b>(8)</b>
Saudi Arabia (Feb/1980~ Apr /2012)	4.208 (2)	1.89 (2)	<b>4.008</b> <b>(10)</b>	<b>1.777</b> <b>(10)</b>
South Africa (Jan/1957~ May/2012)	4.001 (18)	1.29 (18)	<b>9.978</b> <b>(16)</b>	<b>1.956</b> <b>(16)</b>
Turkey (Jan/1969~ May/2012)	0.825 (18)	-0.287 (18)	<b>7.165</b> <b>(12)</b>	<b>2.36</b> <b>(11)</b>
United Kingdom (Jan/1988~ May/2012)	-0.158 (14)	-2.101 (14)	<b>-0.375</b> <b>(11)</b>	<b>-1.349</b> <b>(10)</b>
United States (Jan/1957~ May/2012)	1.805 (14)	-3.162 <sup>c</sup> (14)	<b>3.843</b> <b>(4)</b>	<b>-3.423<sup>b</sup></b> <b>(11)</b>

Note: We use non-durable manufacturing, petroleum and coal products, crude petroleum products for Argentina and Saudi Arabia, and manufacturing for Indonesia and South Africa. The lag length was set by AIC on every occasion. Note that a) rejects the null hypothesis at the 1% level, b) rejects the null hypothesis at the 5% level, and c) rejects the null hypothesis at the 10% level.

[Table 4] Unit Root Tests: Inflation Rate

	ADF Test		Phillips-Perron Test	
	Constant	Constant+Trend	Constant	Constant+Trend
Argentina	-3.548 <sup>a</sup> (19)	-3.591 <sup>b</sup> (19)	-8.982 <sup>a</sup> (11)	-9.020 <sup>a</sup> (11)
Brazil	-3.179 <sup>b</sup> (3)	-3.788 <sup>b</sup> (3)	-3.259 <sup>b</sup> (9)	-3.907 <sup>b</sup> (8)
Canada	-2.287 (11)	-2.441 (11)	-23.090 <sup>a</sup> (17)	-23.224 <sup>a</sup> (17)
France	-2.469 (17)	-2.544 (17)	-16.961 <sup>a</sup> (18)	-18.207 <sup>a</sup> (18)
Germany	-3.463 <sup>a</sup> (11)	-3.208 <sup>c</sup> (11)	-18.003 <sup>a</sup> (3)	-18.446 <sup>a</sup> (1)
India	-6.800 <sup>a</sup> (18)	-6.846 <sup>a</sup> (18)	-15.348 <sup>a</sup> (17)	-15.331 <sup>a</sup> (17)
Indonesia	-4.863 <sup>a</sup> (14)	-5.656 <sup>a</sup> (17)	-22.223 <sup>a</sup> (10)	-22.301 <sup>a</sup> (10)
Italy	-2.201 (14)	-2.350 (14)	-14.217 <sup>a</sup> (16)	-14.558 <sup>a</sup> (16)
Japan	-2.978 <sup>b</sup> (13)	-4.145 <sup>a</sup> (13)	-25.608 <sup>a</sup> (18)	-24.819 <sup>a</sup> (17)
Korea	-2.809 <sup>c</sup> (14)	-3.639 <sup>b</sup> (14)	-11.710 <sup>a</sup> (6)	-12.842 <sup>a</sup> (2)
Mexico	-2.842 <sup>c</sup> (12)	-2.824 (12)	-9.338 <sup>a</sup> (12)	-9.355 <sup>a</sup> (12)
Russia	-3.821 <sup>a</sup> (2)	-4.228 <sup>a</sup> (2)	-5.561 <sup>a</sup> (7)	-6.808 <sup>a</sup> (8)
Saudi Arabia	-6.974 <sup>a</sup> (3)	-11.981 <sup>a</sup> (1)	-17.822 <sup>a</sup> (10)	-17.861 <sup>a</sup> (9)
South Africa	-2.506 (11)	-2.462 (11)	-26.505 <sup>a</sup> (18)	-26.630 <sup>a</sup> (18)
Turkey	-2.378 (12)	-2.415 (12)	-15.044 <sup>a</sup> (10)	-15.037 <sup>a</sup> (10)
United Kingdom	-2.207 (13)	-2.187 (13)	-15.578 <sup>a</sup> (8)	-15.742 <sup>a</sup> (11)
United States	-2.847 <sup>c</sup> (12)	-2.930 (12)	-14.058 <sup>a</sup> (11)	-14.124 <sup>a</sup> (11)

Note: We use non-durable manufacturing, petroleum and coal products, crude petroleum products for Argentina and Saudi Arabia, and manufacturing for Indonesia and South Africa. The lag length was set by AIC on every occasion. Note that a) rejects the null hypothesis at the 1% level, b) rejects the null hypothesis at the 5% level, and c) rejects the null hypothesis at the 10% level.

**[Table 5] Unit Root Tests: Commodity Price**

	ADF Test		Phillips-Perron Test	
	Constant	Constant+Trend	Constant	Constant+Trend
Energy price (Jan/1992~Apr/2012)	0.222 (13)	-3.916 <sup>b</sup> (2)	-0.842 (6)	-2.912 (6)
Non-energy price (Jan/1980~Apr/2012)	-0.369 (13)	-1.504 (13)	-0.672 (9)	-1.885 (9)
Log difference of Energy Price (Feb/1992~Apr/2012)	-5.252 <sup>a</sup> (12)	-5.323 <sup>a</sup> (12)	-11.635 <sup>a</sup> (2)	-11.633 <sup>a</sup> (2)
Log difference of Non-energy Price (Feb/1980~Apr/2012)	-10.045 <sup>a</sup> (1)	-10.09 <sup>a</sup> (1)	-13.541 <sup>a</sup> (7)	-13.585 <sup>a</sup> (6)

Note: “a, b, and c” denote a rejection of the null hypothesis at the 1%, 5% and 10% level respectively.

## 2. Univariate Analysis

How ones measure volatility is not a simple task and there are various measurements of volatility in the literature. For example, many studies use the moving-average of the standard deviation of the percentage changes of real exchange rate to analyze the relationship between exchange rate volatility and international trade.<sup>51</sup> The advantage of the moving-average approach lies in its simple calculation. On the other hand, Pozo (1992) points out that the moving average of the standard deviation is inappropriate because speculative or asset price changes appear to be leptokurtic in their distribution. Instead of the moving average of the standard deviation, Pozo (1992) suggests the usage of GARCH volatility because it is time dependent and provides more information about the second moments of the variables.<sup>52</sup> Here we use GARCH specification to describe commodity price volatility.

As a preliminary examination of how uncertainty of commodity price affects the output of each country, we consider simple univariate model as follows:

<sup>51</sup> See Cushman (1988), Koray and Lastrapes (1989), Chowdhury (1993).

<sup>52</sup> Hamilton (1983) uses changes in the nominal oil price as an indicator of oil price shocks.

$$\text{UM1: } \Delta \log(IP_t) = \beta_0 + \sum_{i=1}^p \phi_i \Delta \log(IP_{t-i}) + \beta_1 \sigma_{\pi,t}^2 + \varepsilon_t, \quad (4)$$

$$\text{UM2: } \Delta \log(IP_t) = \beta_0 + \sum_{i=1}^p \phi_i \Delta \log(IP_{t-i}) + \beta_1 \sigma_{\pi,t}^2 + \beta_2 \sigma_{ec,t}^2 + \varepsilon_t, \quad (5)$$

$$\text{UM3: } \Delta \log(IP_t) = \beta_0 + \sum_{i=1}^p \phi_i \Delta \log(IP_{t-i}) + \beta_1 \sigma_{\pi,t}^2 + \beta_2 \sigma_{nec,t}^2 + \varepsilon_t, \quad (6)$$

where UM1, UM2, and UM3 denote univariate model 1, model 2 and model 3 respectively,  $\sigma_{\pi,t}^2$  (GARCH volatility) is the conditional variance of the inflation which is estimated from the GARCH model,  $\sigma_{ec,t}^2$  &  $\sigma_{nec,t}^2$  are the conditional variance of the change in the energy commodity price and the change in the non-energy commodity price respectively. In the UM1 (equation 4), inflation volatility is included and so we examine whether inflation uncertainty affects output growth. In the similar context, we examine whether energy commodity price uncertainty has additional information beyond inflation uncertainty for output growth by including the conditional volatility of the change in energy commodity price in the UM2 (equation 5) and whether non-energy commodity price uncertainty does by including the volatility of the change in non-energy commodity price in the UM3 (equation 6).

The estimation results for the UM1, UM2, and UM3 are reported in Table 6-1 through Table 6.1 -6.17. The lags of percentage changes in industrial productions are determined by AIC given the maximum lag as four. Friedman (1977) points out that inflation uncertainty lowers output growth because it causes problems by discouraging long term wage contracts and other economic contracts related with inflation. We expect a negative sign in our estimates. From the estimation results of the UM1, we found that 8 countries among 17 countries have negative effect of inflation volatility on output growth and the estimated coefficient is statistically significant only in Mexico, Russia, and the U.S. Note that as an exception, the inflation uncertainty of Japan shows a positive effect upon its economic growth. However, the inflation uncertainty of most countries does not have a statistically significant effect on their economic growth.

The estimation results for the UM2 are quite consistent. In 14 countries among 17 countries, the estimated coefficient on the energy commodity price volatility is negative and they are statistically significant in Argentina, Germany, Italy, Japan, Mexico, Saudi Arabia, South Africa, and the U.K. It is quite interesting that the uncertainty of energy commodity price of the oil export countries such as Mexico, Saudi Arabia and the U.K. each has a negative effect on their respective country's economic growth. However, Mexico and the U.K. show that the size of this negative effect was smaller than that affecting the oil importing countries. Overall, this result is consistent with Lee, Ni, and Ratti (1995) and Elder and Serletis (2010).

The estimation results for the UM3 are quite similar to the case of UM2. 15 countries have negative coefficient on non-energy commodity price volatility and it is statistically significant in

France, Germany, Italy, Japan, South Korea, and the U.K. It is quite interesting to note that five G7 countries have this negative effect.

Overall, the estimation results for simple univariate models indicate that commodity price volatility has a negative impact on output growth and both energy commodity price volatility and non-energy commodity price volatility matter for economic growth.

**[Table 6.1] Estimation Results of Univariate model: Argentina**

ARG	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model 1	0.014 (0.111)	0.016 (0.013)			-0.722 <sup>a</sup> (0.046)	-0.263 <sup>a</sup> (0.045)			0.374	5.654
Model 2	1.375 <sup>c</sup> (0.767)	0.002 (0.251)	-0.207 <sup>c</sup> (0.11)		-0.688 <sup>a</sup> (0.065)	-0.279 <sup>a</sup> (0.065)			0.347	5.911
Model 3	0.244 (0.367)	0.015 (0.014)		-0.110 (0.157)	-0.71 <sup>a</sup> (0.051)	-0.267 <sup>a</sup> (0.051)			0.364	5.679

Note that a) rejects the null hypothesis at the 1% level, b) rejects the null hypothesis at the 5% level, and c) rejects the null hypothesis at the 10% level from Table 6-1 to Table 6-17

**[Table 6.2] Estimation Results of Univariate model: Brazil**

BRA	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model 1	0.114 (0.156)	0.071 (0.053)			-0.029 (0.063)				0.008	4.433
Model 2	0.354 (0.652)	0.073 (0.056)	-0.035 (0.095)		-0.059 (0.065)				0.014	4.325
Model 3	0.489 (0.445)	0.056 (0.056)		-0.156 (0.173)	-0.032 (0.063)				0.011	4.437

**[Table 6.3] Estimation Results of Univariate model: Canada**

CAN	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model 1	0.484 <sup>c</sup> (0.25)	-0.617 (0.712)			-0.175 <sup>a</sup> (0.039)	0.088 <sup>b</sup> (0.039)	0.133 <sup>a</sup> (0.039)		0.054	3.074
Model 2	0.655 <sup>a</sup> (0.21)	-0.423 (0.633)	-0.041 (0.027)		-0.041 (0.065)	0.138 <sup>b</sup> (0.065)	0.116 <sup>c</sup> (0.066)		0.067	1.169
Model 3	0.565 <sup>c</sup> (0.317)	-0.711 (0.794)		-0.055 (0.084)	-0.068 (0.051)	0.112 <sup>b</sup> (0.051)	0.185 <sup>a</sup> (0.05)		0.055	2.788

**[Table 6.4] Estimation Results of univariate model: France**



FRA	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model 1	0.021 (0.156)	0.49 (0.49)			-0.293 <sup>a</sup> (0.039)	-0.297 <sup>a</sup> (0.039)	-0.075 <sup>c</sup> (0.039)		0.124	4.465
Model 2	1.662 <sup>c</sup> (0.997)	-3.95 (4)	-0.091 (0.058)		-0.282 <sup>a</sup> (0.064)	0.143 <sup>b</sup> (0.066)	0.206 <sup>a</sup> (0.064)		0.143	3.168
Model 3	1.1 <sup>c</sup> (0.596)	-2.549 (2.436)		-0.173 <sup>b</sup> (0.074)	-0.323 <sup>a</sup> (0.051)	0.037 (0.054)	0.14 <sup>a</sup> (0.051)		0.136	3.07

**Table 6-5 Estimation Results of univariate model: Germany**

GER	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model 1	0.942 (0.916)	-2.704 (2.929)			-0.122 <sup>c</sup> (0.063)	0.155 <sup>b</sup> (0.062)	0.239 <sup>a</sup> (0.062)		0.088	3.723
Model 2	7.737 <sup>a</sup> (1.977)	17.987 a (5.506)	-0.342 <sup>a</sup> (0.09)		-0.167 <sup>a</sup> (0.064)	0.142 <sup>b</sup> (0.064)	0.268 <sup>a</sup> (0.064)		0.155	3.677
Model 3	2.882 <sup>b</sup> (1.131)	-5.498 <sup>c</sup> (3.121)		-0.474 <sup>a</sup> (0.156)	-0.132 <sup>b</sup> (0.062)	0.152 <sup>b</sup> (0.062)	0.267 <sup>a</sup> (0.062)		0.121	3.695

**[Table 6.6] Estimation Results of univariate model: India**

IND	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model 1	0.417 <sup>c</sup> (0.241)	0.076 (0.269)			-0.551 <sup>a</sup> (0.042)	-0.305 <sup>a</sup> (0.047)	-0.125 <sup>a</sup> (0.047)	-0.124 <sup>a</sup> (0.042)	0.245	4.442
Model 2	0.251 (0.468)	-0.047 (0.487)	0.054 (0.048)		-0.657 <sup>a</sup> (0.065)	-0.277 <sup>a</sup> (0.077)	-0.012 (0.076)	-0.109 <sup>c</sup> (0.064)	0.349	4.332
Model 3	0.454 (0.347)	0.022 (0.409)		0.035 (0.08)	-0.577 <sup>a</sup> (0.051)	-0.295 <sup>a</sup> (0.059)	-0.142 <sup>b</sup> (0.059)	-0.152 <sup>a</sup> (0.051)	0.266	4.484

**[Table 6.7] Estimation Results of univariate model: India**

INE	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model 1	-0.235 (0.704)	0.33 (0.56)			-0.433 <sup>a</sup> (0.074)	-0.157 <sup>b</sup> (0.074)			0.163	6.781
Model 2	-1.618 (2.061)	0.389 (0.565)	0.191 (0.267)		-0.437 <sup>a</sup> (0.074)	-0.16 <sup>b</sup> (0.074)			0.165	6.789
Model 3	-0.29 (1.31)	0.337 (0.576)		0.020 (0.393)	-0.434 <sup>a</sup> (0.074)	-0.157 <sup>b</sup> (0.074)			0.163	6.792

**[Table 6.8] Estimation Results of univariate model: Italy**

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ITA	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model 1	0.125 (0.155)	0.247 (0.423)			-0.265 <sup>a</sup> (0.039)	0.011 (0.041)	0.036 (0.039)		0.072	4.328
Model 2	1.699 <sup>b</sup> (0.796)	-1.92 (2.781)	-0.214 <sup>a</sup> (0.08)		-0.141 <sup>b</sup> (0.064)	0.174 <sup>a</sup> (0.063)	0.252 <sup>a</sup> (0.064)		0.116	3.5
Model 3	0.525 <sup>c</sup> (0.273)	0.255 (0.627)		-0.251 <sup>b</sup> (0.098)	-0.302 <sup>a</sup> (0.051)	0.016 (0.053)	0.172 <sup>a</sup> (0.051)		0.126	3.734

[Table 6.9] Estimation Results of univariate model: Japan

JAP	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model 1	-0.249 (0.197)	0.99 <sup>a</sup> (0.297)			0.046 (0.039)				0.02	3.943
Model 2	2.568 <sup>c</sup> (1.453)	-3.404 (3.008)	-0.212 <sup>c</sup> (0.111)		0.111 <sup>c</sup> (0.065)				0.032	4.359
Model 3	0.702 (0.486)	0.149 (0.713)		-0.304 <sup>b</sup> (0.138)	0.023 (0.051)				0.014	4.11

[Table 6.10] Estimation Results of univariate model: South Korea

KOR	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model 1	0.657 <sup>a</sup> (0.237)	0.275 (0.345)			-0.121 <sup>a</sup> (0.044)				0.016	4.538
Model 2	1.424 (1.064)	-1.972 (1.737)	0.016 (0.105)		0.005 (0.065)				0.006	4.556
Model 3	1.343 <sup>a</sup> (0.47)	-0.119 (0.541)		-0.260 <sup>c</sup> (0.152)	-0.11 <sup>b</sup> (0.051)				0.019	4.57

[Table 6.11] Estimation Results of univariate model: Mexico

MEX	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model 1	0.427 <sup>a</sup> (0.129)	-0.268 <sup>a</sup> (0.094)			-0.149 <sup>a</sup> (0.05)	0.151 <sup>a</sup> (0.051)	0.172 <sup>a</sup> (0.051)	0.219 <sup>a</sup> (0.051)	0.137	3.164
Model 2	1.539 <sup>a</sup> (0.514)	-0.89 <sup>a</sup> (0.274)	-0.125 <sup>c</sup> (0.069)		-0.111 <sup>c</sup> (0.064)	0.108 (0.065)	0.057 (0.065)	0.268 <sup>a</sup> (0.063)	0.164	3.177

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Model	0.773 <sup>a</sup>	-0.283 <sup>a</sup>		-0.151	-0.151 <sup>a</sup>	0.152 <sup>a</sup>	0.177 <sup>a</sup>	0.227 <sup>a</sup>		
3	(0.291)	(0.095)		(0.112)	(0.051)	(0.051)	(0.051)	(0.051)	0.142	3.168

[Table 6.12] Estimation Results of univariate model: Russia

RUS	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model	0.348 <sup>c</sup>	-0.191 <sup>a</sup>			-0.117 <sup>c</sup>	-0.237 <sup>a</sup>	-0.15 <sup>b</sup>			
1	(0.184)	(0.054)			(0.07)	(0.069)	(0.071)		0.051	5.406
Model	1.062	-0.195 <sup>a</sup>	-0.106		-0.12 <sup>c</sup>	-0.24 <sup>a</sup>	-0.154 <sup>b</sup>			
2	(0.872)	(0.054)	(0.127)		(0.071)	(0.069)	(0.071)		0.054	5.412
Model	0.765	-0.201 <sup>a</sup>		-0.170	-0.12 <sup>c</sup>	-0.243 <sup>a</sup>	-0.157 <sup>b</sup>			
3	(0.517)	(0.055)		(0.199)	(0.07)	(0.069)	(0.071)		0.054	5.412

[Table 6.13] Estimation Results of univariate model: Saudi Arabia

SAU	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model	0.927	-1.8			-0.123 <sup>b</sup>	0.045				
1	(0.716)	(1.198)			(0.052)	(0.052)			0.024	6.874
Model	2.087 <sup>b</sup>	-0.763	-0.254 <sup>b</sup>		-0.647 <sup>a</sup>	-0.19 <sup>a</sup>				
2	(0.855)	(0.609)	(0.112)		(0.064)	(0.064)			0.329	5.822
Model	1.077	-1.805		-0.066	-0.122 <sup>b</sup>	0.045				
3	(1.333)	(1.2)		(0.495)	(0.052)	(0.052)			0.024	6.879

[Table 6.14] Estimation Results of univariate model: South Africa

SOU	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model	0.515 <sup>a</sup>	-0.439			-0.577 <sup>a</sup>	-0.179 <sup>a</sup>	0.214 <sup>a</sup>			
1	(0.184)	(0.318)			(0.04)	(0.045)	(0.04)		0.346	4.533
Model	0.977	0.177	-0.143 <sup>b</sup>		-0.428 <sup>a</sup>	-0.153 <sup>b</sup>	0.167 <sup>b</sup>			
2	(0.761)	(1.381)	(0.065)		(0.066)	(0.071)	(0.066)		0.213	4.259
Model	0.616	-0.263		-0.168	-0.438 <sup>a</sup>	-0.106 <sup>c</sup>	0.177 <sup>a</sup>			
3	(0.432)	(0.56)		(0.113)	(0.051)	(0.056)	(0.051)		0.213	4.379

[Table 6.15] Estimation Results of univariate model: Turkey

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TUR	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model 1	0.206 (0.315)	0.082 (0.145)			-0.66 <sup>a</sup> (0.055)	-0.207 <sup>a</sup> (0.054)			0.329	5.909
Model 2	0.754 (0.998)	0.046 (0.165)	-0.082 (0.125)		-0.66 <sup>a</sup> (0.065)	-0.162 <sup>b</sup> (0.065)			0.341	5.822
Model 3	0.691 (0.648)	0.029 (0.157)		-0.170 (0.199)	-0.662 <sup>a</sup> (0.055)	-0.208 <sup>a</sup> (0.054)			0.331	5.913

[Table 6.16] Estimation Results of univariate model: UK

UK	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model 1	0.304 (0.5)	-0.72 (1.169)			-0.229 <sup>a</sup> (0.06)	0.008 (0.061)	0.078 (0.06)		0.059	2.58
Model 2	1.591 (1.977)	-2.002 (4.465)	-0.111 <sup>a</sup> (0.032)		-0.236 <sup>a</sup> (0.064)	-0.006 (0.067)	0.098 (0.065)		0.097	2.471
Model 3	0.542 (0.474)	-0.422 (1.085)		-0.160 <sup>a</sup> (0.052)	-0.262 <sup>a</sup> (0.06)	-0.029 (0.062)	0.055 (0.06)		0.089	2.555

[Table 6.17] Estimation Results of univariate model: U.S.

US	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	$\phi_1$	$\phi_2$	$\phi_3$	$\phi_4$	R <sup>2</sup>	AIC
Model 1	0.549 <sup>a</sup> (0.156)	-1.243 <sup>b</sup> (0.556)			0.323 <sup>a</sup> (0.039)	0.087 <sup>b</sup> (0.041)	0.078 <sup>b</sup> (0.04)		0.184	2.34
Model 2	0.885 <sup>a</sup> (0.271)	-1.15 <sup>c</sup> (0.677)	-0.058 (0.053)		0.033 (0.065)	0.175 <sup>a</sup> (0.064)	0.174 <sup>b</sup> (0.068)		0.179	1.876
Model 3	0.713 <sup>a</sup> (0.179)	-0.997 <sup>c</sup> (0.542)		-0.111 (0.073)	0.101 <sup>b</sup> (0.051)	0.182 <sup>a</sup> (0.051)	0.129 <sup>b</sup> (0.052)		0.146	1.909

### 3. Multivariate Analysis

The univariate model does not consider the parameters of interest in an internally consistent fashion. To avoid this issue, we employ bivariate structural GARCH-in-mean VAR which is outlined in the Section III. The bivariate structural GARCH-in-mean VAR model is composed of two equations (1) and (3). Equation (1) is a mean equation and equation (3) is a variance equation and simultaneously estimates the parameters of interest in the mean and the variance equation.

We use AIC to choose the optimal lags for each model. The point estimates of the variance equations are reported in Table 7.1 and 7.2. Most of the ARCH and GARCH coefficients are statistically significant except those of some countries, such as Argentina's industrial production variance equation. From Tables 8 and 9, we easily find that the GARCH effect is stronger in energy and non-energy variance equations compared to industrial production variance equations. This result implies that the coefficient on the lagged squared error is very persistent and statistically significant at a conventional level for energy and non-energy variance equations. The GARCH effect of the U.S.'s energy variance equation shows the most persistent effect. Amongst non-energy variance equations, the GARCH effect of Japan's non-energy variance equation shows the most persistent effect.

The effects of uncertainty of energy and non-energy commodity prices on output growth are reported in Tables 8.1 and 8.2. This is  $\hat{\Gamma}_{11}$ , the estimated coefficient of  $H_{11}(t)^{1/2}$  for each industrial production equation. In 12 countries among 17 countries, the estimated coefficient on the conditional volatility of the energy commodity price on industrial production is negative though four countries' coefficients are statistically significant. These are Argentina, Saudi Arabia, U.K., and U.S.A. In the case of non-energy commodity price volatility, 13 countries have negative coefficients but the estimated coefficients are statistically significant only for Canada, Japan, Russia, and Turkey. Overall, commodity price volatility appears to have a negative impact on output growth for most G20 countries though statistical significance is relatively weak.

[Table 7.1] Coefficient Estimates for the Variance Function of the Bivariate GARCH-in-Mean

VAR: Energy			
	$\mu_i$	$\alpha_i$	$\beta_i$
Argentina			
Energy	18.764 <sup>b</sup> (9.109)	0.13 <sup>b</sup> (0.06)	0.406 <sup>c</sup> (0.232)
Industrial Production	7.48 <sup>a</sup> (2.465)	0.341 (0.288)	0.316 (0.203)
Brazil			
Energy	2.357 (2.041)	0.11 <sup>a</sup> (0.041)	0.828 <sup>a</sup> (0.064)
Industrial Production	2.283 <sup>a</sup> (0.291)	0.474 <sup>a</sup> (0.131)	0 <sup>a</sup> (0)
Canada			
Energy	2.093 (2.341)	0.11 <sup>b</sup> (0.046)	0.834 <sup>a</sup> (0.081)
Industrial Production	0.007 (0.006)	0.183 <sup>b</sup> (0.08)	0.804 <sup>a</sup> (0.091)
France			
Energy	12.186 (8.773)	0.132 <sup>b</sup> (0.054)	0.565 <sup>b</sup> (0.227)
Industrial Production	0.059 (0.079)	0.017 (0.024)	0.932 <sup>a</sup> (0.079)
Germany			
Energy	31.694 <sup>a</sup> (3.333)	0.201 <sup>b</sup> (0.081)	0 <sup>a</sup> (0)
Industrial Production	0.876 <sup>a</sup> (0.251)	0.511 <sup>a</sup> (0.162)	0.131 (0.161)
India			
Energy	3.554 (3.651)	0.109 <sup>b</sup> (0.049)	0.798 <sup>a</sup> (0.117)
Industrial Production	2.334 <sup>a</sup> (0.286)	0.424 <sup>a</sup> (0.116)	0 <sup>a</sup> (0)
Indonesia			
Energy	35.379 <sup>a</sup> (5.011)	0.256 <sup>b</sup> (0.106)	0 <sup>a</sup> (0)
Industrial Production	11.508 <sup>a</sup> (0.898)	0 <sup>a</sup> (0)	0.741 <sup>a</sup> (0.015)
Italy			
Energy	0.78 (1.331)	0.177 <sup>c</sup> (0.101)	0.789 <sup>a</sup> (0.121)
Industrial Production	0.642 <sup>a</sup> (0.135)	0.198 (0.17)	0 <sup>a</sup> (0)
Japan			
Energy	2.412 <sup>c</sup> (1.461)	0.112 <sup>a</sup> (0.035)	0.823 <sup>a</sup> (0.038)
Industrial Production	0.687 <sup>a</sup> (0.168)	0.86 <sup>a</sup> (0.11)	0.132 (0.103)

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Korea			
Energy	34.476 <sup>a</sup> (12.841)	0.274 <sup>b</sup> (0.135)	-0.14 (0.372)
Industrial Production	1.463 <sup>a</sup> (0.498)	0.255 <sup>a</sup> (0.097)	0.441 <sup>a</sup> (0.135)
Mexico			
Energy	2.259 (2.842)	0.109 <sup>b</sup> (0.047)	0.831 <sup>a</sup> (0.095)
Industrial Production	0.059 (0.04)	0.13 <sup>b</sup> (0.052)	0.832 <sup>a</sup> (0.064)
Russia			
Energy	18.739 <sup>b</sup> (8.222)	0.12 <sup>c</sup> (0.067)	0.458 <sup>b</sup> (0.2)
Industrial Production	0.125 <sup>c</sup> (0.068)	0.256 <sup>a</sup> (0.041)	0.739 <sup>a</sup> (0.041)
Saudi Arabia			
Energy	2.478 (1.987)	0.117 <sup>b</sup> (0.046)	0.819 <sup>a</sup> (0.069)
Industrial Production	3.763 <sup>a</sup> (0.273)	0 <sup>a</sup> (0)	0.767 <sup>a</sup> (0.017)
South Africa			
Energy	4.674 (3.846)	0.122a (0.045)	0.761a (0.103)
Industrial Production	1.697 (1.062)	0.127 (0.103)	0.417 (0.316)
Turkey			
Energy	2.009 (2.216)	0.104 <sup>b</sup> (0.042)	0.843 <sup>a</sup> (0.075)
Industrial Production	8.105 <sup>a</sup> (1.875)	0.83 <sup>a</sup> (0.202)	0 <sup>a</sup> (0)
UK			
Energy	6.942 (4.669)	0.131 <sup>b</sup> (0.052)	0.691 <sup>a</sup> (0.112)
Industrial Production	0.401 <sup>a</sup> (0.055)	0.405 <sup>a</sup> (0.124)	0 <sup>a</sup> (0)
US			
Energy	1.254 (1.575)	0.096 <sup>b</sup> (0.046)	0.868 <sup>a</sup> (0.068)
Industrial Production	0.188 <sup>a</sup> (0.051)	0.412 <sup>a</sup> (0.146)	0.142 (0.133)

Note that a) rejects the null hypothesis at the 1% level, b) rejects the null hypothesis at the 5% level, and c) rejects the null hypothesis at the 10% level.

[Table 7.2] Coefficient Estimates for the Variance Function of the Bivariate GARCH-in-Mean VAR

	$\mu_i$	$\alpha_i$	$\beta_i$
Argentina			
Non-Energy	0.292 (0.219)	0.159 <sup>b</sup> (0.069)	0.797 <sup>a</sup> (0.091)
Industrial Production	6.176 <sup>a</sup> (2.099)	0.126 <sup>b</sup> (0.06)	0.465 <sup>a</sup> (0.166)
Brazil			
Non-Energy	0.255 (0.17)	0.151 <sup>b</sup> (0.069)	0.799 <sup>a</sup> (0.092)
Industrial Production	1.912 <sup>a</sup> (0.52)	0.51 <sup>a</sup> (0.159)	0.133 (0.14)
Canada			
Non-Energy	0.325 <sup>a</sup> (0.024)	0.193 <sup>a</sup> (0.053)	0.766 <sup>a</sup> (0.038)
Industrial Production	0.005 <sup>b</sup> (0.002)	0.16 <sup>a</sup> (0)	0.838 <sup>a</sup> (0.002)
France			
Non-Energy	0.407 (0.266)	0.214 <sup>a</sup> (0.074)	0.73 <sup>a</sup> (0.094)
Industrial Production	0.857 <sup>a</sup> (0.081)	0.212 <sup>a</sup> (0.065)	0 <sup>a</sup> (0)
Germany			
Non-Energy	0.114 (0.072)	0.086 <sup>a</sup> (0.029)	0.89 <sup>a</sup> (0.034)
Industrial Production	0.67 <sup>a</sup> (0.204)	0.653 <sup>a</sup> (0.169)	0.122 (0.131)
India			
Non-Energy	0.267 (0.182)	0.154 <sup>b</sup> (0.062)	0.81 <sup>a</sup> (0.074)
Industrial Production	0.765 <sup>c</sup> (0.418)	0.206 <sup>a</sup> (0.066)	0.636 <sup>a</sup> (0.133)
Indonesia			
Non-Energy	0.118 (0.133)	0.141 <sup>a</sup> (0.052)	0.857 <sup>a</sup> (0.053)
Industrial Production	0 <sup>a</sup> (0)	0.169 <sup>a</sup> (0.037)	0.875 <sup>a</sup> (0.022)
Italy			
Non-Energy	3.411 <sup>a</sup> (0.32)	0.409 <sup>a</sup> (0.092)	0 <sup>a</sup> (0)
Industrial Production	0.016 (0.014)	0.065 <sup>a</sup> (0.022)	0.932 <sup>a</sup> (0.024)
Japan			
Non-Energy	0.102 (0.08)	0.062 <sup>c</sup> (0.033)	0.92 <sup>a</sup> (0.042)



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Industrial Production	0.513 <sup>a</sup> (0.103)	0.575 <sup>a</sup> (0.106)	0.354 <sup>a</sup> (0.082)
<b>Korea</b>			
Non-Energy	0.558 (0.365)	0.211 <sup>a</sup> (0.067)	0.698 <sup>a</sup> (0.118)
Industrial Production	0.842 <sup>a</sup> (0.325)	0.217 <sup>b</sup> (0.091)	0.638 <sup>a</sup> (0.074)
<b>Mexico</b>			
Non-Energy	0.274 (0.185)	0.158 <sup>b</sup> (0.064)	0.805 <sup>a</sup> (0.078)
Industrial Production	0.051 (0.032)	0.101 <sup>b</sup> (0.043)	0.859 <sup>a</sup> (0.058)
<b>Russia</b>			
Non-Energy	0.686 <sup>c</sup> (0.379)	0.239 <sup>a</sup> (0.069)	0.655 <sup>a</sup> (0.101)
Industrial Production	0.116 <sup>c</sup> (0.063)	0.256 <sup>a</sup> (0.03)	0.738 <sup>a</sup> (0.03)
<b>Saudi Arabia</b>			
Non-Energy	0.308 (0.203)	0.165 <sup>b</sup> (0.066)	0.79 <sup>a</sup> (0.084)
Industrial Production	8.39 <sup>a</sup> (2.674)	0.388 <sup>a</sup> (0.11)	0.485 <sup>a</sup> (0.121)
<b>South Africa</b>			
Non-Energy	0.288 <sup>c</sup> (0.167)	0.167 <sup>b</sup> (0.066)	0.793 <sup>a</sup> (0.075)
Industrial Production	2.484 <sup>a</sup> (0.768)	0.221 <sup>a</sup> (0.082)	0.198 (0.194)
<b>Turkey</b>			
Non-Energy	0.595 <sup>b</sup> (0.271)	0.247 <sup>a</sup> (0.061)	0.652 <sup>a</sup> (0.085)
Industrial Production	9.872 <sup>a</sup> (1.215)	0.955 <sup>a</sup> (0.075)	0 <sup>a</sup> (0)
<b>UK</b>			
Non-Energy	0.215 (0.138)	0.197 <sup>a</sup> (0.074)	0.79 <sup>a</sup> (0.078)
Industrial Production	0.508 <sup>a</sup> (0.06)	0.294 <sup>a</sup> (0.109)	0 <sup>a</sup> (0)
<b>US</b>			
Non-Energy	0.276 <sup>c</sup> (0.157)	0.178 <sup>a</sup> (0.067)	0.789 <sup>a</sup> (0.071)
Industrial Production	0.187 <sup>a</sup> (0.042)	0.375 <sup>a</sup> (0.097)	0.176 (0.117)

Note that a) rejects the null hypothesis at the 1% level, b) rejects the null hypothesis at the 5% level, and c) rejects the null hypothesis at the 10% level.

**[Table 8.1] Coefficient Estimates on Commodity Price Volatility**

Inflation Rate	Coefficient on $H_{11}(t)^{1/2}$ , commodity price volatility(Energy)
Argentina	-0.031 (0.025)
Brazil	-0.014 (0.012)
Canada	-0.012 (0.014)
France	-0.039 <sup>b</sup> (0.019)
Germany	-0.042 <sup>a</sup> (0.007)
India	0.019 (0.042)
Indonesia	-0.144 <sup>c</sup> (0.081)
Italy	-0.022 <sup>c</sup> (0.012)
Japan	-0.014 <sup>a</sup> (0)
Korea	-0.038 <sup>c</sup> (0.02)
Mexico	-0.009 <sup>b</sup> (0.004)
Russia	-0.031 <sup>a</sup> (0.004)
Saudi Arabia	-0.004 (0.022)
South Africa	-0.035 (0.023)
Turkey	-0.598 <sup>a</sup> (0.121)
UK	-0.038 (0.024)
US	-0.07 <sup>a</sup> (0.026)

Note that a) rejects the null hypothesis at the 1% level, b) rejects the null hypothesis at the 5% level, and c) rejects the null hypothesis at the 10% level.

**[Table 8.2] Coefficient Estimates on Commodity Price Volatility**

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Inflation Rate	Coefficient on $H_{11}(t)^{1/2}$ , commodity price volatility(Non-Energy)
Argentina	0.014 (0.02)
Brazil	-0.007 (0.019)
Canada	0.002 (0.022)
France	0.000 (0.017)
Germany	-0.030 (0.021)
India	0.052 (0.05)
Indonesia	-0.015 (0.031)
Italy	-0.013 (0.012)
Japan	-0.061 <sup>a</sup> (0.02)
Korea	-0.030 (0.025)
Mexico	-0.005 (0.023)
Russia	-0.051 <sup>a</sup> (0.01)
Saudi Arabia	0.059 (0.053)
South Africa	-0.026 (0.032)
Turkey	-0.339 <sup>a</sup> (0.126)
UK	0.026 (0.028)
US	0.001 (0.018)

Note that a) rejects the null hypothesis at the 1% level, b) rejects the null hypothesis at the 5% level, and c) rejects the null hypothesis at the 10% level.

Cavalcanti et al. (2012) illustrate that commodity price uncertainty mainly lowers the accumulation of physical capital. Although such channel is not clearly illustrated in our study, we expect that such channel may work through mainly commodity exporting countries.

## V. Concluding remarks

Recently we witnessed commodity price surge and increased volatility of commodity prices and scholars, market analysts and policymakers have been worried about the effect of commodity price volatility on the economy. Generally, movements in prices may have important implications for resource allocation as well as consumer and producer welfare. Existing literature shows that volatility has a negative impact at the macroeconomic level on growth and poverty.

In this study, we examine empirical relationship between the commodity price volatility and G20 economies. Specifically we focus on the effect of commodity price uncertainty on output growth. Methodologically, we employ a structural GARCH-in-mean VAR that is modified to accommodate GARCH-in-mean error to capture the effect of commodity price uncertainty on output growth. Our preliminary result from simple univariate model shows that commodity price volatility has a negative impact on output growth and both energy commodity price volatility and non-energy commodity price volatility matter for economic growth. Furthermore, our principal result from multivariate GARCH-in-mean VAR is that uncertainty about the price of energy and non-energy commodity price has a negative and significant effect on real output even after controlling for lagged commodity prices and lagged real output.

The empirical results presented here have strong policy implications. It is important to know the evolution of price volatility to help in the design of appropriate policies and to help market participants to better accommodate links between volatility and economic crisis. Our study supports that policies that can help to mitigate the risk of commodity price volatility and some market-based instruments to lessen the extent of world market commodity price volatility are important policy priority. As suggested in FAO et al. (2011) and G20-report (2011), policies coping with volatility in the short run such as buffer stocks, emergency food reserves, international and national safety nets, and coping with volatility in the long run such as market-based mechanisms to protect producers against price and other risks need to be warranted in line with improvements in the conduct of macroeconomic policy, and better management of resource income volatility through sovereign wealth funds (SWF) as well as stabilization funds.

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## Session 2

# Increase in Energy and Commodity Price and Volatility



### Presentation 4

## Patrick Messerlin

Professor at Sciences Po, France

Patrick Messerlin is Chairman of ECIPE's Steering Committee/Advisory Board, Professor emeritus of economics at Sciences Po Paris, and Director of Groupe d'Economie Mondiale (GEM) at Sciences Po since its creation in 1997. GEM is an independent research unit seeking to improve the performance of French and European public policies in a global world.

From 1986 to 1990, Patrick Messerlin was a Senior Economist at the Research Department of the World Bank. In 1990, he joined Sciences Po as a Professor of economics. He was also a visiting professor at the University of Houston (Texas, USA), Simon Fraser University (British Columbia, Canada), Johann Wolfgang Goethe Universität (Frankfurt Am Main, Germany) and Keio University (Tokyo, Japan). He has written many books and articles on his areas of expertise.

In 2001-2002, Patrick Messerlin was a special advisor to Mike Moore, the WTO Director General. He also served as a member of the Preparatory Conference to the G7-G8 Summits (a group of independent persons gathered by the Peterson Institute for International Economics and the Tokyo Foundation). In 2003-2005, he co-chaired with Ernesto Zedillo, Director of the Yale Center for the Study of Globalization, the Task Force on "Trade for Development" for the Millennium Development Goals of the United Nations. In 2008-2011, he also co-chaired with Ernest Zedillo the joint World Bank & UK Department for International Development Task Force on Global Finance and Trade Architecture. In 2009-2012, he was a member of the World Economic Forum's Global Trade Council, which he chaired in 2010-2011. During all these years, he has been a consultant to many international organizations, governments and firms.



## EU commodities policies and volatility of world prices

### EU commodities policies and volatility of world prices

Patrick A. Messerlin

10 September 2012

First draft—Note to be quoted

In a recent paper, the European Commission (hereafter the Commission) tabled a Communication outlining the main challenges faced by the EU in the commodities markets, and the main responses to be adopted by the EU [Commission 2012]. One of the most remarkable aspects of the Communication is the width of the markets covered—from farm products to energy to a large chunk of raw materials (metallic minerals, wood, natural rubber, etc.). Of course, this recent widening of the scope of the EU commodity policies has been triggered by the hikes of key commodity prices since 2005-2006 and by the rising fear of a lack of access to some key raw materials.

The paper examines whether past and current components of the EU commodities policies have contributed to the volatility of world commodity prices. Much of the debate today tends to focus on the role of some financial instruments (future markets) in widening price volatility, hence on the need to regulate these instruments. As of today, there is no convincing evidence of speculator contribution [Irwin and Sanders 2010, Scott and Irwin 2012]. As a result, the first thing to do is to examine the impact of past and existing policies on today world prices volatility. If it happens that such policies increase substantially prices volatility—as they do—the first measures to be taken should be to reform these policies.

The paper is organized in three sections devoted to different—but sometimes inter-connected—markets. Section 1 focuses on agriculture, one of the traditional epicenters of volatility of world prices and the realm of the EU and EU Member States' agricultural policies. Section 2 examines the energy markets, the other epicenter of volatility of world prices, with a quite different involvement of European governments. Section 3 examines the raw materials, such as the “rare earth” products, which have been very recently added in the EU commodities policies. It is interesting to note that all these products are of prime interest for the Russian economy.

#### SECTION 1. EU AND EUMS FARM POLICIES

The section is organized as follows. Sub-section 1.1 argues that, despite the lack of price volatility during these three decades, the “initial” EU Common Agricultural Policy (CAP) (the term “initial”

refers to the period from the mid-1960s to the mid-1990s) has created conditions propitious to price volatility in the world markets for a very long time—much beyond the period of enforcement of these policies. Sub-section 1.2 argues that the CAP reforms introduced between mid-1990s and mid-2000s have been more limited than often stated, hence without the ability to undo the effects of the initial CAP. Sub-section 1.3 analyses a new set of regulations largely driven by a few EU Member States (hereafter EUMS) which have amplified the negative impact of EU policies on the world farm prices volatility by curbing significantly EU productivity (technology-inhibiting norms on food products and production processes) and by reducing EU land available to agricultural production (biofuels policy).

### **1.1. The “initial” CAP: sowing the seeds for agricultural world prices volatility**

The Treaty of Rome (1958) devotes a full chapter to agriculture, a feature reflecting the importance of agriculture in Europe at this time: it involved 18.5 percent of the EU6 labor force in 1955, with a wide variance among EUMS (from 12.5 percent in Belgium to 37.7 percent in Italy).<sup>53</sup> Moreover, it is written in the context of a secular protection of European agriculture where farmers were seen in crucial European countries (France, Germany, Italy, etc.) as providing key political stability during European industrialization [Swinnen 2010, Messerlin 19\*\*].

By contrast, in the mid-1990s, when the EU membership was still limited to rich and fully industrialized Western European countries, both the global importance and the variance of the farm labor force have sharply declined, opening the door to ever deeper CAP reforms. Unfortunately, the EU enlargement to Central European countries in the late 2000s has reversed this trend: the global EU farm labor force has increased from 3 (before the accession of the central European Member States) to 4.7 (after accession) percent, with again a high variance, with a peak of 19 percent of the labor force in Romania. As a result, the most recent EUMS exert strong pressures for keeping the CAP as unchanged as possible, putting a *de facto* halt to CAP reforms. Indeed, very little is expected from the new round of EU reforms scheduled for 2013. The only remaining source of pro-reform pressures is the budgetary constraint—but, so far, it does not seem to bite.

The two key instruments of the initial Common Agricultural Policy were (i) “target” (fixed at the EU level) prices for the key farm products (cereals, meat, etc., potatoes being the only exception) (ii) “variable levies” that push up world prices at the EU border to the level of EU target prices for the goods under the target price scheme, and (iii) export subsidies [for a detailed history of this period, see BAE 1985 and Josling 2009]. In sharp contrast, it is crucial to stress that the CAP has never

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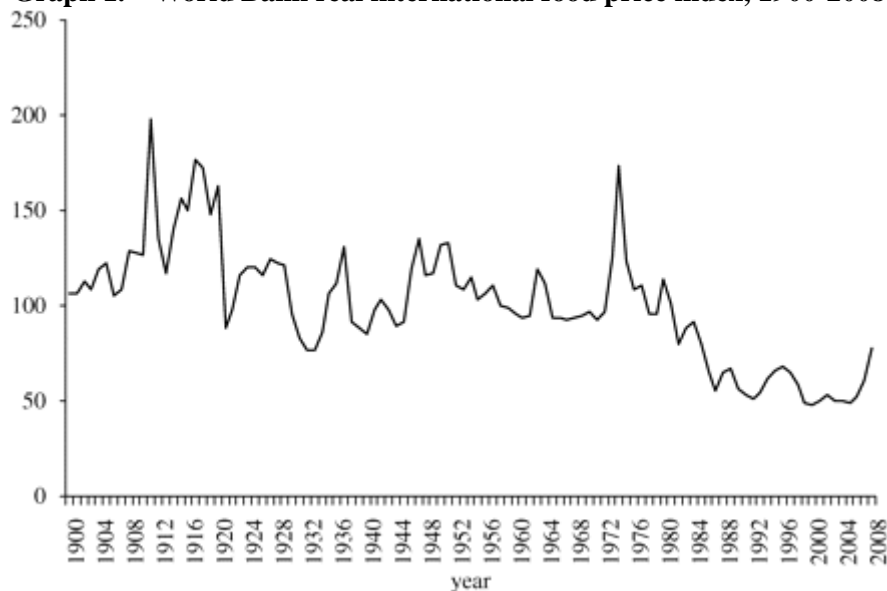
<sup>53</sup> For simplicity sake, the paper will not mention the term European Community in use for most of the period covered, but will only use the term European Union, followed by the number of EU Members States, when needed for designing a subset of EUMS.

addressed the problems related to the two key inputs of farm production—land use and water use. Both inputs have been left under EUMS exclusive regulations, with often negative consequences on world prices volatility in agriculture, as argued below.

The initial CAP has generated strong incentives to increase EU farm production because (i) target prices were fixed at increasingly high level (hence permitted to produce at high costs), (ii) variable levies were ensuring a prohibitive protection against foreign farm products, and (iii) export subsidies allowing farm products to be dumped on world markets, hence to depress world prices. Within a decade, the CAP boosted the EU agricultural output to the point that the EU shifted from a situation of net importer of many farm products to a situation of net exporter.<sup>54</sup>

This dramatic evolution is rarely related to the point that the “initial” CAP has been a source of prices volatility in the world food markets. Indeed, Graph 1 shows a steady decline of the price index of agricultural products over the whole period, with only two hikes well identified—in the late 1940s-early 1950s (rebuilding the world economy) and early 1970s (collapse of USSR wheat crop). For the sake of information, the international food price index reached 85 in 2008, decreased in 2009-2010 to roughly 78, and is around 95 for 2012—a coming back to the level of the late 1950s and 1960s [Anderson 2012].

**Graph 1. World Bank real international food price index, 1900-2008**



Source: World Bank

However, the apparent smoothness of this trend can be explained by conditions related to an environment which happen to be quite different from the one prevailing today—hence were not sustainable in the long run:

<sup>54</sup> Indeed, this consequence was fully understood by the CAP “father”, Sicco Mansholt, who realized well the negative sides of the CAP without having been able to convince EU farmers and politicians.

- potentially huge developing countries in terms of food markets (China and India most notably) were not integrated in the world economy, and/or their income was so low that they could not have a big weight in world farm markets, and/or some of them (India) were investing in agriculture (“green” revolutions) in the 1960s and early 1970s.
- another key difference was the attitude with respect to food shortage, as best illustrated by China. The “Great Leap Forward” decided by Mao-ZeDong in 1958-1961—with its death toll of 18-32 millions of Chinese, four to eight times the previous world biggest famine which occurred in Bengal in 1943—did not exert any pressure on world food prices because China’s government rejected the recourse to world food markets to save its starving population. Indeed, the Green Revolution in India was a reaction to the Bengal famine. This attitude is in sharp contrast with today systematic recourse to international food aid in case of hunger in countries in difficulties (with the exception of North Korea).
- CAP instruments mean that price volatility was repressed at the cost of increased “quantity volatility”. High EU domestic prices triggered stocks of subsidized farm products at unprecedented level (in 1983, stocks of skimmed milk powder represented half the EU annual consumption). These stocks were dumped on the world markets, with profound consequences since they were massive by the world standard: in 1987, stocks of beef represented 30 percent of annual world trade in beef. Such a situation has two indirect effects which tend to hide volatility.
  - ❖ price sensitivity to shocks in supply is smaller when stocks are high than when they are small. Thanks to high EU target prices, CAP was systematically generating high stocks, hence reduce price sensitivity as long as EU excess agricultural supply was felt as politically sustainable by the EU authorities.
  - ❖ quantity volatility differs from price volatility because governments’ decisions are much slower than market decisions—hence, quantity volatility is not accompanied by the impression of fast roller-coasters associated to prices volatility.
- Lastly, oil prices were low until the early 1970s. During these years, oil has become a key input in farm production, with farmers investing in machines and fertilizers all the more heavily because they were subsidized. The oil shocks of the early and late 1970s were solved in a few years because (i) there were no large world economies growing at a rate higher than 4-5 percent, (ii) the oil supply was expanded with large new reserves, and (iii) there were massive energy savings in the OECD countries. Oil prices went back to their 1975 level from the early 1980s to the late 1990s [Anderson 2012].

However, these specific circumstances should not hide the fact that the initial CAP has progressively created a set of conditions favorable to today and future farm world prices volatility:

- The “initial” CAP has reduced forever the agricultural production capacities of many developing countries, in particular of those having long and deep trade and political relations with the EU (such as the African, Caribbean and Pacific, or ACPs) which happen to be also those with the highest cases of short supply. This impact was particularly strong for the EU farm products benefiting from massive export subsidies—such as some dairy products or sugar. The main reason for such a negative effect is that EU farm exports have induced developing countries’ farmers first to curb their investments in farming (green revolution) then to leave farming as CAP-generated distortions were continuing.<sup>55</sup> Going back to farming would require high and stable farm prices in the world markets. This is not what is happening: farm prices hikes are high, but so far they have not been persistent enough to send clear signals to local farmers.
- the initial CAP has provided good income to Western EU farmers (still 85 percent of the total EU farm production in 2010) compared to average non-farm income [OECD 20\*\*]. Such a situation did not induce farmers to address emerging land and water problems and to make a better use of these two critical natural resources:
  - relatively high incomes did not induce farmers to follow an aggressive policy of land consolidation. Rather, EU farmers have used their subsidies for (over)-investing in equipment, fertilizers, etc., all the more because EUMS regulations have imposed many obstacles to land consolidation. As a result, today EU farm sector is still too fragmented to exploit fully the potential scale economies allowed by modern technology, a situation in turn inhibiting EU farmers to push to modern—more efficient but also scale-demanding—technologies (see below).
  - the initial CAP has never taken into account the water intensity of the subsidized farm productions. The most subsidized and/or protected crops have often been water-intensive—as best illustrated by corn. Even worse, many EUMS have not hesitated to subsidize lavishly water use by systematically excluding farmers from existing water pricing schemes and even by sheer subsidization of water use.

To sum up, the “initial” CAP of the 1960s-early1990s has generated entrenched incentives on technology, land and water converging to reduce the capacity of EU farm production to react strongly to price hikes in the late 2000s and beyond.

## **1.2. CAP reforms: too limited to curb the negative impact of the initial CAP**

As already mentioned, CAP reforms in 1992 and 2003 have introduced more economically sound instruments—namely a wide substitution of direct income support to price support (the so-called

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<sup>55</sup> In this respect, bananas is an exception. Then the EU banana policy has induced some ACP countries to invest in bananas with the intent to get successful competitors to “dollar” bananas (mostly from Central and South American countries).

“decoupling”) and of tariffs to variable levies. However, these reforms are more limited than it seems at a first glance because of several features:

- these reforms have not been accompanied by tariff cuts. Such cuts were expected to be negotiated in the Doha Round which has failed so far. EU farm products continue thus to be substantially protected, and EU food products even more so (tariffs on food products are higher than those on farm products in order to induce food producers to keep buying EU farm products): on average 55 percent (milk) 35 percent (grains, 32 percent (meat) with peaks over 200 percent. Moreover, a third of the EU farm tariffs are specific, hence have an intrinsic anti-cyclical feature: they protect EU farmers more strongly when prices are low, hence they reduce the incentives of EU farmers to reassess their operations (to exit some crops, hence to enter into other crops).
- these reforms have been accompanied by a freeze in the CAP total budget (Euros 50 billions in 2009 vs. Euros 55 billions during the 1996-1999 peak period). This freeze is the net result of a decline of the CAP budget for Western EU farmers and an increase of the CAP budget for Central EU farmers (new EUMS). But, the decline of the budget for Western farmers is smaller than the decrease of the number of these farmers—meaning that, on average, each Western EU farmer has been increasingly subsidized. Meanwhile, the increase of the CAP budget for Central EU farmers does not prevent many small Central EU farmers to leave agriculture because the amount of subsidies by farmer is very small; as a result, the growth rate of subsidy per remaining Central EU farmer is increasing rapidly (the increase of agricultural income per annual working unit in 2011 is higher than 20 percent in most Central European Member States [Commission 2012]).
- there is no time limit to the income support paid to EU farmers. No mechanism requires some cuts in or elimination of the income support when EU farmers retire or die. In other words, there are no inbuilt incentives for increasing farm consolidation in the EU.
- the income support scheme has been accompanied by the introduction or re-enforcement of instruments still coupled with specific farm products, particularly in the key EUMS which have chosen “history-based” implementation procedures [for detail see Cantore, Kennan and Page 2011]. Such EUMS represent 44 to 51 percent of EU farm output since they include France, Italy, Netherlands, Spain and Britain (Scotland and Wales).

All these observations suggest that the CAP reforms of the two last decades did not reverse the negative impact of the “initial” CAP on world agricultural markets. Interestingly, changes in EU farm output have been small—either at the aggregated level or at the level of key individual crops (cereals, meat, etc.)—and the EU is still a net exporter in many products.

Last but not least, the current prices volatility has induced the EU and its EUMS which are the most supportive of the CAP to present the CAP as a model for the future farm policies of developing

countries facing difficulties in terms of “food security”. Indeed, this term has often a strong protectionist message which ignores the increasingly severe land and water issues at the local and world level. In particular, the water issues that the EU did not face during the 1960s-1990s because Western Europe is relatively water-abundant are emerging in the EU itself today, including in Western Europe.

### **1.3. Recent agriculture-related regulations: a strongly negative impact on volatility**

The limited positive impact that CAP reforms have had on world agricultural prices volatility has been more than counter-balanced by the strongly negative effects of EU regulations on farm technology and products adopted since the 1980s—in particular beef hormones, genetically modified organisms (GMOs) and biofuels. These new regulations have EU-wide window-dressing aspects, but they have been largely driven by some EUMS—Italy for beef hormones, France for GMOs, Germany for biofuels.

The important role of the EUMS should not come as a surprise. CAP has always had an awkward feature, though rarely recognized: it has always been hailed as the first “common” EU policy,<sup>56</sup> but in fact CAP has prevented the creation of truly EU integrated (common) market in agriculture. This is simply because the CAP subsidy component has always been strong enough to offer to EU farmers of each EUMS a substantial protection from farmers of other EUMSs.<sup>57</sup>

The EUMS dominant role has three sources which are quite different in their nature but which converge in generating more instability in the world agricultural markets:

- the introduction of the so-called “second pillar” of the CAP (see above) which mitigates substantially the decoupling dimensions of the CAP reforms.
- setting norms which are largely hostile to technical progress, hence impose long-lasting curbs on EU supply capacity. These norms impose tight constraints on methods of production: bans on most hormones, bans on almost all genetically modified organisms, or GMOs, a rigid system of geographical indications, or GIs. Norms on farm products *per se* (sanitary and phytosanitary measures, or SPS) have a similar, though probably more limited, impact.
- an “agro-energy” policy imposing a mandatory use of EU-made “biofuels” from rapeseeds to corn to be substituted to oil, hence inter-connecting farm and energy markets with immediate and dramatic consequences on farm prices volatility.

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<sup>56</sup> The EU Iron and Steel Treaty was used as a basis of an EU-wide policy in these sectors only in the 1970s during the steel crisis following the oil prices increases.

<sup>57</sup> The EU banana policy has a very strong EUMS dimension: “EU” quotas and regimes have been largely based on an EUMS basis, and they have been amplified by anti-competitive practices, particularly at the wholesale and retail distribution level (which have reduced substantially the benefits that ACP banana producers could get from their banana crops).

What follows focuses on the most important EUMS policies. Those policies coincided with CAP reforms: the mid-1990s (Mc Sharry reform) for the technology-inhibiting policies and the early 2000s (Fischler reform) for biofuels—a simultaneity that suggests that one hidden but important motive behind their introduction has been to “protect” farmers against the “adverse” CAP reforms.

*Technology-inhibiting EUMS policies: bans on growth hormones and GMOs*

Until 1980, only a few EUMS—Italy being the main leader—prohibited the use of most of the six available growth hormones. Starting in 1981, EUMS bans have become EU-wide bans—despite the initial opposition of the (mostly large) farmers from the largest beef-producing EUMS (Britain, France and Germany). In 1988, the EU-wide ban covered all the hormones while leaving some flexibility to EU farmers to use banned hormones under veterinary supervision for cost-reduction and therapeutic purposes (opening an opaque situation since the enforcement policy of the various EUMS seems to have never been homogeneous, opening the doors to different practices). By contrast, the EU imposed a ban on beef imports from countries, except if beef was certified hormone-free. The trade ban was thus much stricter than the ban on EU production.

How was the adoption of a EU-wide ban possible, despite some initial strong opposition in several large EUMS? This situation results from very different but mutually re-enforcing motives:

- self-appointed consumers lobbyists who have learned on how to bank on the fears generated by unrelated but simultaneous crises of “hormones scandals” (in the late 1970s in Italy) and, more importantly, of the repetitive crises of the “mad cow disease” (bovine spongiform encephalopathy, or BSE) in the EU from 1986 to 2004, particularly in Britain (see below).
- increasingly weak opposition of farmers in the initially reluctant EUMS because they were confronted to a long term decline of EU meat consumption (amplified by the BSE crisis). As a result, EU farmers became increasingly in favor of technology-inhibiting norms which were able to slow down competition among themselves, while transforming the existing tariff- and quota-based protection on non-EU beef production into an almost complete ban.
- the Commission who perceived this regulatory game as a way to grab power, attract support from lobbyists, and respect from the consumers,
- the members of the European Parliament who were elected directly for the first time and who wanted to show their muscles.

That said, the capacity of the EU wide ban on beef hormones to fragment the world beef markets—a sure source of prices volatility in increasingly smaller markets—was dwarfed by the BCE-related bans. The EU bans on beef was the first of a long series of similar bans: bans by non-EU countries on



imports of EU beef, and bans by EUMS on imports of beef imported from other EUMS. All these bans raise tough questions from an economic and ethical points of view:

- at the peak of the BSE in Britain, roughly 4,4 million of cattle were incinerated while East Africa was plagued by severe food shortages. Nobody dared to raise the ethical question of such a massive elimination of food which was condemning to death African starving poor (by incinerating beef which could be exported to Africa) on the basis of a yet very uncertain information on the BSE-related health risks (in the early 2000s, the estimated death toll from BSE ranged from several hundreds of people to several hundreds of thousands of people). For comparison sake, the BSE toll on Europeans is estimated today to roughly 170 in Britain and 104 in the rest of the world, while the death toll in East Africa in the 1990s is estimated to several hundreds of thousands of people (and contributed to the disintegration of Sudan and Somalia with its consequences on periodic food shortages).
- In 2000, the French government imposed a ban on beef imports from Britain, whereas the British authorities have already taken the appropriate measures to eliminate such risks since 1998. In sharp contrast, the French government has not yet taken any measure to make French beef as safe as British beef (on the ground that French beef was “safe”). In short, the French ban on British beef has increased—not decreased—the exposure of French consumers to the disease. Indeed, the death toll on French consumers is the second highest in Europe, after Britain.

The BSE panic made easy for the coalition of self elected consumers lobbyists and the Commission to introduce bans on most of the genetically modified organisms (GMOs). *The text on GMOs has to be done*

#### *The biofuels mandatory use*

In 2003, the “Renewable Energy Directive” (or RED) imposed the mandatory use of renewable energy in EU transport.<sup>58</sup> The minimum mandatory use targets were fixed at 5.75 percent of the whole energy in transport by 2010 and at 10 percent by 2020. The RED has two features that deserve to be mentioned:

- although the RED covers renewable energy of any form (hydrogen, electricity, etc.), it clearly sees biofuels as the *de facto* main source of renewable energy—a situation that reflects the insufficient technological progress in many renewable energies, but that is also largely related to the huge subsidization of biofuels, as shown below.

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<sup>58</sup> In EU parlance, a Directive is equivalent to a law, except that it has to be translated into EUMS domestic law for being enforceable in the EUMS. The FQD mentions additional “indicative targets” of 2 percent—a first 2 percent reduction related to electric cars, and a second 2 percent related to the purchase of Clean Development Mechanism (CDM) credits.

- although the RED mentions the whole transport sector, the main transport activity concerned is road transport based on diesel engines (as of today, the use of biofuels in rail, maritime or air transport remains anecdotal). In fact, in addition to the EU farmers, two main lobbies have strongly supported the RED: the environmentalist lobbies which did not want to pay attention to the dubious environmental impact of the biofuels in question, and the EU car industry, particularly the German and French carmakers.

The EU biofuels policy was flanked by three additional documents:

- the Fuel Quality Directive (or FQD) sets a sustainability criterion for producing biofuels which consists in a minimum target on the direct emissions saved when having recourse to biofuels, namely a 6 percent reduction of the CO<sub>2</sub> intensity of transport fuel used in the EU.
- the Commission felt compelled to introduce in the EU regulations the condition that land intensive in biodiversity and carbon (forests) should be banned from being used in the production of biofuels. Although stated in general terms, this condition is *de facto* discriminatory since it hurts more the developing countries' ability to produce biofuels than EU's one where most initial biodiversity-intensive land and forests have gone since a long time. Ultimately, this condition boils down to a plain protectionist measure since imports of biofuels produced on such lands into the EU are indirectly prohibited.
- last but not least, a very complex set of tax exemptions, direct and indirect subsidies to be granted to EU farmers growing biofuels was designed, mostly at the level of individual EUMS [GSI/IISD Report 2012]. As shown by Table Biofuels-1, the EU subsidies amount to US\$ 8 billion in total [IEA 2009] with an important feature: it is mostly devoted to biofuels because the EU car fleet is largely based on diesel engines.

**Table Biofuels-1. Estimated subsidies to biofuels production, billion US\$, 2009**

	Bioethanol	Biodiesel
<b>US</b>	<b>7.7</b>	<b>0.4</b>
<b>EU</b>	<b>2.1</b>	<b>5.8</b>
<b>Brazil</b>	<b>2.6</b>	<b>0.1</b>
<b>China</b>	<b>0.4</b>	<b>0.1</b>

Source: IEA 2009.

There is an increasing recognition that the negative consequences of the EU biofuels policy far exceed its positive effects for the following reasons:

- the mere magnitude of the subsidies granted implies a huge setback with respect to the CAP reform. In 2009, the EU income support amounted roughly US\$ 45 billions. In other words, biofuels subsidies (granted to a small set of specific crops) amount thus to roughly 18 percent of the income support.

- the level of protection of the EU biofuels sector is extremely high. A sense of the global—combining tax exemptions, subsidies, etc.—level of protection is provided by the Australian Productivity’s methodology estimating “tariff equivalents” of all the measures taken. Such estimates are available for four EUMS and biofuels, and show that the level of assistance to the whole production chain (farmers, industrial plants, logistics, etc.) can reach some astronomical level—almost 10,000 percent in 2006 [Amaral 2008].
- there are increasingly strong doubts on the ability of the EU biofuels production to reach their alleged environmental target—the greenhouse gas savings imposed by the sustainability test set up by the FQD—which is the core reason of the whole policy. A recent study [Pehnelt and Vietze 2012] suggest that 8 out of the 10 tests conducted on locally-produced (Central Germany) rapeseed biodiesel failed to show the 35 percent greenhouse gas savings (in most cases, it was under 30 percent) [EurActiv 21 August 2012]. It is argued that meeting the EU environmental target would require a substantial shift to bio-ethanol (based on sugar cane) while the EU car fleet runs mostly on (bio)-diesel.
- Last but not least, the biofuels production in the EU requires land and water which were initially devoted to food production. The current amount of land used by EU biofuels production is estimated to 4 millions of hectares—equivalent to the whole arable land of Ireland, or to 4.3 percent of the total arable land available in the five largest EU producers (Austria, Britain, France, Germany, Spain and Sweden produced roughly 90 percent of EU27 biofuels production in 2008).

In short, EU biofuels protection can be analyzed as a substantial destruction of land and water resources for producing food. In this respect, it artificially increases the world prices of farm and food products—the opposite impact of the “initial” CAP. In this sense, it increases world prices volatility. This helps to understand the high to very high estimates of the contribution of biofuels production to various food price rises on the world prices in 2006-2008 which are reported in Table Biofuels-2. Depending the estimates, this contribution ranges from 12 percent to 75 percent, with a “concentration” of the estimates around 30 percent.

**Table Biofuels-2. Estimated contribution of biofuel production to world food price rises, 2006-2008**

<b>Institution</b>	<b>Authors</b>	<b>Estimated contribution</b>
<b>Word Bank</b>	<b>[Mitchel 2008]</b>	<b>70-75% (several crops)</b>
<b>IMF</b>	<b>[Lipsky 2008]</b>	<b>70% (maize) 40% (soybean)</b>
<b>IFPRI</b>	<b>[Rosegrant 2008]</b>	<b>25-30% (several crops)</b>
<b>US Federal Reserve</b>	<b>[Baier and al. 2009]</b>	<b>12% (several crops)</b>
<b>US CBO</b>	<b>[CBO 2009]</b>	<b>28-47% (maize)</b>

Source: GSI-IISD, 2012.

## SECTION 2. EU AND EUMS ENERGY POLICIES

EU and EUMS energy policies occur in a technological, economic and political environment which differs a lot depending on the energy source at stake:

- coal and oil production, transportation and distribution in the EU are largely based on market forces determined at the world level even if there is a massive involvement of EUMS governments, for instance under the form of subsidies (in particular to coal production in Germany until 2018) or taxes (taxes on gasoline in all the EUMS). Both products are relatively easy to move from one place to another, by pipeline, ship or any other means, and they exhibit limited vertical integration: many coal and oil world producers are not distributors, and a notable share of EU distributors are not owned by EU or foreign producers. As a result, the level of oligopoly in the markets of these products raises problems that a competition policy properly enforced can handle without the support of specific regulations. An important consequence of all these characteristics is that, from an international perspective, the level of dependency of the EU vis-à-vis the rest of the world is high, but does not raise specific security concerns. If one source of coal or oil stops, there are alternative sources. Of course, the EU consumers could pay more, but consumers in the rest of the world would also pay more, if one excepts the case where exporting countries would impose export controls (quotas or taxes) in order to depress artificially the prices paid by their consumers, a costly policy for their own firms if only because it creates incentives to find additional coal and oil resources, hence generates additional competition to the incumbents. In short, coal and oil do not seem to raise to the EU more (or less) problems than any major commodity for the decades to come.
- by contrast, electricity and natural gas are not easily tradable with the current technologies and EU grid infrastructures. This common feature explains that both sources of energy are subjected to EU regulations based on the same economic principle of “unbundling” the production, transportation and distribution stages in order to limit monopoly power of vertically integrated firms. That said, these two sources of energy differ in one key respect: the EU produces almost all the electricity it consumes (a feature which partly mirrors the current low tradability of electricity on long distance) while it produces only 35 percent of the natural gas it consumes. As a result, the EU gas policy has a much more important international dimension than the EU electricity policy. This difference has been recently exacerbated by the fact that the international aspects of the EU gas policy is dominated by one country and one firm: Russian gas amounts to 33 percent of EU imports of gas, and Gazprom delivers the vast majority of these imports.

The section focuses on the EU natural gas policy. It also presents briefly two other aspects of the EU

energy policy: the EU fragmented approach to shale gas exploitation, and the energy dimension of the EU climate change policy which echoes the biofuels policy.

## **2.1 The EU natural gas policy**

It took a long time for the EU to start to build its electricity and gas policies. The first Gas Directive was adopted in 1998 only, and it did not have a notable impact. EUMS gas markets remained fragmented, based on national (quasi) monopolies backed up by national regulators and operating almost exclusively on long term contracts (30-35 years on average, at least officially) with one to less than a handful foreign producers.

This market structure with long term locked vertical integration involving very few EUMS and foreign firms in each EUMS was perceived as the best market structure possible when gas could be transported almost exclusively by surface pipelines. The negative side of such a market structure was its strongly monopolistic nature, and the fact that, in case of sudden disruptions, the EU high dependency on Gazprom has much bigger negative consequences for the EU consumers than Gazprom's (and Russian state's) high dependency on EU consumers. Such a risk was perceived as bearable as long as unexpected disruptions did not occur, that is, as long as trust on both sides did exist.

The late 1990s and early 2000s have witnessed the erosion of this trust. The Third Energy Package was perceived as discriminatory by the Russian side while the EU was alarmed by the increasingly volatile conditions for EU investors in Russia. The January 2009 crisis—the sudden and important cut of Russian supply—was the finishing stroke to the old system. As illustrated by Table G1, cuts were substantial and widespread: 40 of EU GDP was subjected to cuts higher than 25 percent, with 10 percent of EU GDP to cuts higher than 50 percent.

This trust crisis has added a widespread “security” dimension to the economic argument of unbundling which so far was an argument limited to narrow circles. Since then, additional forces have changed the gas sector in the EU with the increasingly intensive recourse to less costly LNG technologies (allowing tankers to be a substitute to pipelines, as in the oil sector) and the realization of the boom in shale gas exploitation in the US (see below).

Despite such a context, the EU gas policy is taking shape at a dramatically low pace. Its “founding” text—the Third Energy Package (TEP)—was drafted in 2007, and adopted in July 2009 (six months after the January cuts of Russian exports). The basic principle introduced by the Package is the “full ownership unbundling” (FOU) which consists in separating production, transport and sales of gas—this is the traditional economic approach for enhancing efficiency and competition in vertically integrated network industries or services.

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There has been a considerable opposition to the adoption of this principle from the domestic monopolies or dominant firms in many EUMS, particularly in France and Germany, joined by Gazprom which supplies more than 40 percent of gas imports in 15 EUMS representing 47.5 percent of EU GDP. The coalition of all these lobbies succeeded to introduce alternative options to the FOU, all of them keeping some links between the energy companies and the transport networks, hence limiting the expected effects from the FOU—the most important of these options being the “independent transmission operator” (ITO). Table Gas1 shows that, based on currently available information, the ITO system will cover a larger share of EU GDP than the FOU principle (43.2 vs. 37.1 percent, respectively).

**Table G1. Selected information on the EU gas markets**

	Gas in the EU		Supply disruptions	Legal situation		Competition situation		
	Gas share in primary energy consumption	Russian gas share in imports	January 2009 cuts of Russian gas exports [a]	Long term contracts signed [a]	Third Package enforcement [a]	Share 3 biggest firms [a]	Share 3 biggest shippers [a]	Competition policy ranking [b]
Austria	15.5	82.0	50-75	2012-2027	ITO	80.0	80-99	12
Belgium	27.7	4.0			FOU	99.4	80-99	14
Britain	30.7	41.2			FOU			17
Bulgaria	11.1	100.0	>75, strong impact	2011-2030	ITO	100.0	100	99 X
Czech Rep.	22.8	74.0	>75, low impact	2014-2035				27 X
Denmark	10.6	0.0			FOU		90	5
Estonia	7.3	100.0	none [a]			99.0	100	35 X
Finland	3.2	100.0	none [a]		exemption	100.0	100	6
France	19.6	16.0	>25	2017-2030	ITO	89.0	80-99	10
Germany	27.0	44.0	<25	2011-2036 [c]	ITO	59.0	<80	3
Greece	3.2	81.0	>75		ITO	100.0	100	59
Hungary	36.1	80.0	>75, low impact		FOU	93.0	92	54 X
Ireland	12.0	0.0			FOU			20
Italy	29.8	30.0	25-50	2012-2035		86.7	64	76
Latvia	12.0	100.0	none [a]		ITO	100.0		63 X
Lithuania	11.2	100.0	none [a]			100.0	100	98 X
Luxembourg	16.3				ITO	100.0	100	16
Netherlands	36.0	0.0			FOU			1
Poland	12.8	68.8	50-75			100.0	97	51 X
Portugal	7.6	0.0						43
Romania	27.1	94.0	25-50			74.0	83	66
Slovak Rep.	29.1	100.0	>75 [b]	2019-2019	ITO	100.0	100	34 X
Slovenia	13.2	52.0	50-75, no major			100.0	100	42
Spain	16.0	0.0			FOU	75.0	75	32
Sweden	1.6	0.0			FOU		100	2

Sources: [a] Dreyer, Erixon and Winkler [2010]. [b] World Economic Forum indicators. Countries with a X are those covered by the Commission’s investigation on Gazprom’s alleged abuse of dominant position.

In this context, what could be the impact of the TEP on the volatility of gas prices? It is too early to have a complete view of the situation since the full implementation of the TEP requires many decisions, but the answer seems to depend on three main forces:

- the TEP *per se* is a first, though incomplete, step in creating a common gas market at the EU27 level. A much larger market than the ones existing so far should generate more stable

prices—shortages here can be compensated by excess supply there. However, the impact of this first force will be largely dependent of the construction of the appropriate transport infrastructures within the EU itself.

- the TEP occurs at a time of technological changes in the gas market (LNG) and closely related markets (shale gas technology). All these forces push in the same direction: gas markets should shift away from the long term contracts which were their usual mode of operation to markets dominated by spot prices. In other words, the problems raised by the gas production, transport and distribution will be increasingly similar to those met in the coal and oil sectors. In this perspective, EU and Russian interests in the long run may converge: none of the two sides has really interest in the old system which tied too strictly the consumers and producers of the sides. Indeed, as best illustrated by the September 2012 APEC Vladivostok Summit, Russia has strong interests to invest heavily in selling its oil and gas to East Asian consumers—starting with the trans-Korean infrastructure which will give to the Russian producers access to East Asian markets with much higher growth perspective than the mature EU markets.
- the TEP impact could (indeed should from an economic point of view) be amplified by a stronger use of competition policy—as it is the case in oil and coal—with respect to both EU and foreign firms in case of abuse of dominant position [Dreyer and al. 2010]. Indeed, a few days ago, the Commission has opened an investigation on Gazprom’s abuse of dominant position in eight EUMS (three of the four for which information is available having adopted the weak ITO system). Interestingly, the average rank of the 27 EUMS in terms of competition policy is 35, while the average rank of the 8 EUMS covered is 58.

The combined of these three forces on price volatility is very hard to tell. The first force should stabilize prices, the second one should increase price volatility (at least in terms of occurrence, maybe not in terms of magnitude), the third force should work for some kind of price stability.

## **2.2. Other EU or EUMS energy-related policies**

Two other energy-related policies deserve a few remarks. Both have been largely driven by some EUMS—climate change by Britain, shale gas by Poland. But if the climate change policy has been “communitarized” (given birth to a EU-wide scheme), the shale gas issue seems to stay on an EUMS track—maybe a lesson from the many difficulties for extending to the EU level decisions which are easy in some EUMS and difficult in others (as in the agricultural policies on beef hormones, GMOs and biofuels).

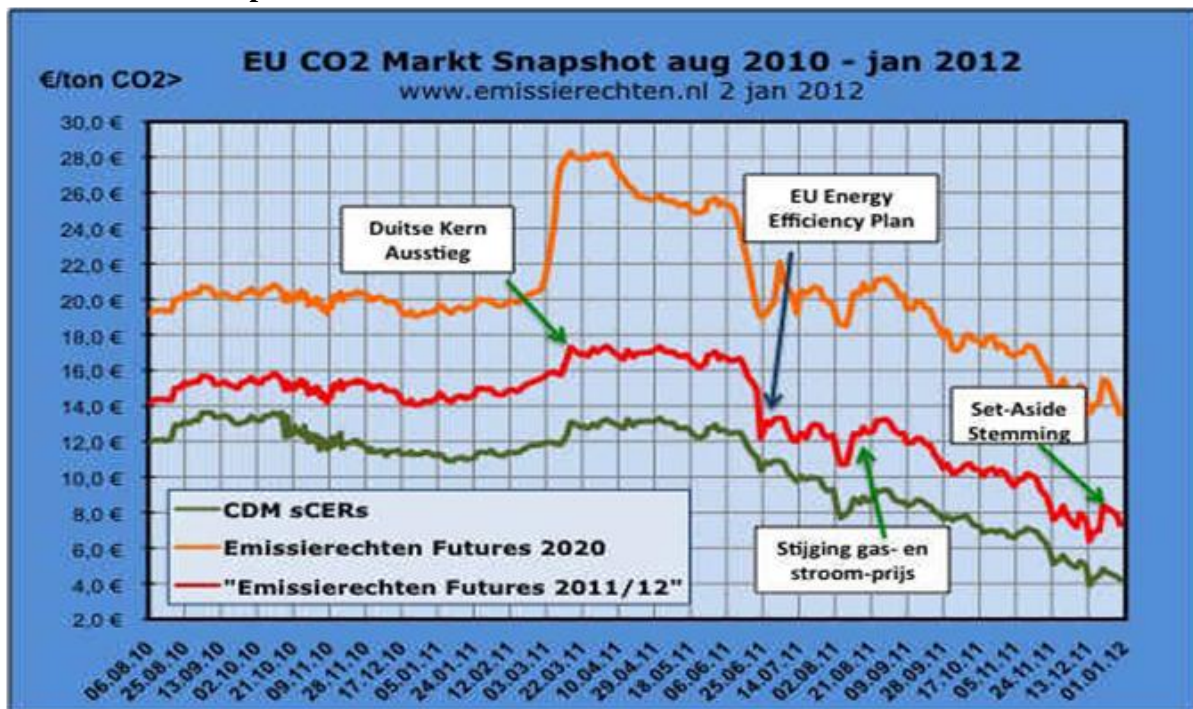
### *EU climate change policy*

In a nutshell, the EU climate change policy it consists in the establishment of a EU27-wide market of CO2 emission permits—the so-called “Emission Trading Scheme” (ETS) which covers half of the EU emissions of CO2 and 40 percent of its total greenhouse gas emissions. Interestingly, the Australian Climate Change Minister has suggested that businesses from non-European countries could join the ETS [BusinessGreen 4 September 2012].

A full review of the EU climate change policy goes much beyond the scope of this paper which focuses on the risk of prices volatility generated by EU policies. In such a limited perspective, the EU policy deserves a few remarks.

First, the EU CO2 permit price has been shown little volatility but at a low level compared to the expectations during the four last years—roughly between 14 and 18 euros per ton of CO2. Moreover, this price has declined sharply since June 2011, reaching less than 8 euros per ton in January 2012, as shown by Chart 2.

Chart 2. EU CO2 prices



Source: <http://www.CO2prices.eu>

This fall is triggering a hot debate in Europe following a Commission’s proposal to intervene in the CO2 market by postponing (“back loading”) the auction of a “certain amount”(undefined) of permits. Indeed, the ETS still faces tough criticisms:

- on the one hand, CO2 large emitters (such as the steel and chemical industries) argue that the ETS induce them to invest outside Europe.



- on the other hand, the emerging vested interests in producing green technology (wind mills, photovoltaic cells and, more importantly, the banking sector supporting them, such as the German bank KfW) argue that the CO<sub>2</sub> permit price is too low and will stay so until 2020 (the end of the third trading period) to induce firms to take action for cutting their CO<sub>2</sub> emissions. A KfW barometer suggests that most investment decisions in energy have been driven by the aim to reduce energy costs—only 9 percent of the firms implement measures with the explicit aim of reducing their CO<sub>2</sub> emissions.

These brief remarks suggest that the ETS is not so different from what is happening in agricultural markets. However, there is a key difference: the capacity of EU intervention is much bigger in the CO<sub>2</sub> permit markets than in the farm markets: Using this capacity runs the risk to make a cap-and-trade regime similar to a tax system without offering the certainty of a tax system and without being based on the wide assessment from the operators that a cap-and-trade regime is supposed to bring. CO<sub>2</sub> permits could become as easy to issue as euros—making possibly the CO<sub>2</sub> markets very prone to volatility if this capacity is used.

#### The shale gas issue

Little can be said on shale gas in the EU because Europe has only very recently realized the vast opportunities offered by this not-so-new technology of gas drilling. Interestingly, EU27 has substantial reserves (640 trillion cubic feet, compared to the US reserves of 860 trillion cubic feet). Moreover, all the EUMS but four (Finland, Greece, Ireland and Italy) have shale gas reserves—the EUMS with the largest potential being Bulgaria, France, Germany, Hungary, Netherland, Poland and Romania.

Why is then the EU so slow in shifting to shale gas which offers many answers to the natural gas issue? The fact that gas prices in EUMS are roughly twice the US gas price and that the security concerns are much higher in the EU should have induced the EU to go for gas shale faster than the US. But, if EU gains are higher, costs are also bigger in the EU (compared to the US) for several reasons:

- a legal system biased against the field owners,
- much better networks and access,
- much more efficient drilling industry (shale gas requires many drills though progress is made to reduce this constraint),
- the perception of the risks. Exploiting shale gas requires water in large quantities, may run the risks of polluting the water reserves used by farmers and households and may generate earthquakes which may be limited in scale, but generate fears in the EU highly populated

areas. As a result, the moratorium imposed on exploiting this resource is not on the resource itself, but on the specific techniques in use.

- the difficulty to make sense of the jungle of the many tax-cum-subsidy packages that are so prevalent in renewable energy (wind mills, solar energy, etc.) and, to a large extent, unpredictable. This reason is particularly important in Germany which has trying to harness its well-developed and powerful equipment industry to renewable energy sources, not to drilling (as required by shale gas).

At this stage, it is hard to predict the speed at which the EU will shift to shale gas. Indeed, a last reason for the EU to go slow is that the boom on shale gas in other parts of the world is enough to change dramatically the energy situation in terms of abundant supply and security concerns.

### **SECTION 3. EU POLICIES ON INDUSTRIAL RAW MATERIALS: EMBRYONIC?**

The Commission Communication [2011] defines industrial (non-energy) raw materials as a long list of metallic minerals (from aluminum to rare earths), construction materials, wood and natural rubber. Altogether, these products represent a non-negligible share (about 10 percent) of EU overall imports [Commission 2012].

Table Raw1 lists the 14 raw materials assessed as the most risky ones by the Commission on the basis of a few criteria: concentration of world production and of sources of EU imports, EU import dependency rate, level of substitutability and recycling rate [Commission 2011]. However, this Table raises a few basic questions:

- it does not provide information on the available reserves in the world for these 14 products. The rare earths case suggests that China may be today largest producer by far, but that there exist several potential producers (Malaysia, etc.) ready to enter the markets if price increase “too much”. The main lesson of the oil history is that price increases due to the use of market monopoly trigger competitors and investments to escape monopoly situations.
- similarly, the substitutability level and the recycling rate should not be taken as fixed, but as a function of the investments made and to be made by the industry (EU and foreign producers and users).
- a notable share of these products have been subjected to EU anti-dumping actions in the past—a feature that echoes the frequent mention of China in the list. What has been the impact of these protectionist anti-dumping measures on the current situation of these markets in terms of competition?

In short, risk-assessment may change dramatically if investment—both in the past as shaped by protectionist measures and in the future—is taken into account. A full risk assessment should take

these two crucial points into consideration.

**Table Raw1. The Commission’s list of the 14 most risky raw materials for the EU**

Raw material	Main producer (2008-2009)	Main source of EU imports (2006, 2007)	Import dependency rate (%)	Substitutability	Recycling rate (%)
Antimony	China	Bolivia	100	0.64	11
Beryllium	USA	[a]	100	na	na
Cobalt	Congo-DRC	Congo-DRC	100	0.90	16
Fluorspar	China	China	100	0.90	0
Gallium	na	[a]	[a]	0.74	0
Germanium	China	China	100	0.80	0
Graphite	China	China	95	0.50	0
Indium	China	China	100	0.90	30
Magnesium	China	China	100	0.82	14
Niobium	Brazil	Brazil	100	0.70	11
Platinums	South Africa	South Africa	100	0.75	35
Rare earths	China	China	100	0.87	1
Tantalum	Australia	China	100	0.40	4
Tungsten	China	Russia	73	0.77	37

Source: Ad-hoc working group [2010], as quoted in Commission [2011].

Though written in general terms, the Communication suggested that the EU should act in three directions:

- more regulations of financial markets (OTC derivatives in particular) with a review of the EU laws (“Directives”) on financial instruments and the creation of the European Securities Markets Authority—the Commission believes in a “*growing inter-dependence of commodities and related financial markets*”,
- more pro-competition measures in energy (oil, electricity and gas) and a review of the Market Abuse Directive to clarify what trading in commodity markets constitutes abuse,
- developing the European “Raw materials initiative” which combines (in a typical Commission’s approach) economic issues (improving the level playing field, boosting efficiency and promoting recycling) with non-economic concerns (promoting human rights, conflict-resolution, non-proliferation and regional stability).

However, in its more recent Second Activity Report on the EU trade policy for raw materials [Commission 2012], the Commission shows that it has no specific instrument, as of today, to use in the context of raw material policies. Rather, it is using three traditional trade policy instruments with a special focus on raw materials.

- the most important effort is the inclusion of rules in preferential agreements to achieve sustainable supply of raw materials, in fact disciplines reining the export policies of the EU trading partners:

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- ❖ disciplines on export duties, such banning existing and future export duties, both in the existing agreements with Colombia, Peru, Ukraine and Central America, and in the agreements currently under negotiations with Canada, India, Malaysia, Mercosur and Singapore.
- ❖ Russia's commitments in addition to its WTO Protocol of Accession not to resort to export duties on a large number of raw materials, specific provisions on raw materials in the agreement with Mongolia and in those launched with Australia and Kazakhstan.
- ❖ additional provisions on investment protection relevant to the extractive industries,
- the EU is using the WTO dispute settlement mechanism. It launched a first case against export restrictive measures applied by China on 9 rare raw materials, with a ruling favorable to the EU in January 2012. The EU then launched a second case against China on 17 rare earths, tungsten and molybdenum.
- the EU is monitoring more closely trade barriers on raw materials with its own inventory of export restrictions which should complement the OECD inventory. And the EU is using the WTO Trade Policy Reviews to putting on the table these issues, etc.

So far, all these three actions may favor in principle a better functioning of the world markets of these products, hence reduce their prices volatility.

**References**

*To be done*

## Session 2

# Increase in Energy and Commodity Price and Volatility



Panelist 1

## Hyun Hoon Lee

Professor at Kangwon National University

Hyun-Hoon Lee is Dean of [Asia-Pacific Cooperation Academy](#) and Professor of International Economics at Kangwon National University, Korea. Recently, he was Senior Analyst at Asia-Pacific Economic Cooperation (APEC) Policy Support Unit. He also served as Senior Environmental Affairs Officer at the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) and has been Visiting Professor/ scholar at the University of Melbourne, Keio University and the Bank of Korea. Dr Lee received his PhD in Economics from the University of Oregon, USA. He has published extensively in books and leading international journals on problems of international trade policy and economic development; and regional economic cooperation in Asia and the Pacific. His books include *Frontiers of Research in Intra-industry Trade* (Palgrave Macmillan), *Korea's Economic Miracle: Fading or Reviving?* (Palgrave Macmillan), *The Korean Economy: Post Crisis, Policies, Issues and Prospects* (Edward Elgar), and *New East Asian Regionalism: Causes, Progress and Country Perspectives* (Edward Elgar).

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## Session 2

# Increase in Energy and Commodity Price and Volatility



### Panelist 2

## Jin Gyu Oh

Senior Researcher of Korea Energy Economics Institute

Dr. Oh is a senior research at the Korea Energy Economics Institute(KEEI) since 1990, which is a government affiliated national research institute, where he has worked on energy and environment issues, especially climate change.

Dr. Oh studied economics at the Seoul National University (1982), and earned a doctoral degree in economics at the Syracuse University in the U.S.A. (1985~1990).

As member of Korean delegation, Dr. Oh participated in major global environmental conferences, which includes the UN Conference on Environment and Development(UNCED) at Rio (1992), the World Summit on Sustainable Development(WSSD, Rio+10) at Johannesburg (2002), and UN Conference on Sustainable Development(UNCSD, Rio+20) at Rio (2012). Dr. Oh participated in various negotiation committee which formulated UN Framework Convention on Climate Change(1992) and the Kyoto Protocol(1997). He also participated in the Conference of Parties to the UNFCCC, which is held yearly.

For many years, Dr. Oh initiated various researches focusing on national strategies on climate mitigation. Recently, he conducted three year study on "Strategies for Green Growth in Energy Sector"(2009~2011). In addition, he carried out "Climate Cooperation projects" in Indonesia, Cambodia, and Philippines.

## Session 2

# Increase in Energy and Commodity Price and Volatility



### Panelist 3

## Tomoo Inoue

Professor at Seikei University, Japan

Tomoo Inoue is an applied econometrician, is currently a professor of economics at Seikei University.

He published papers in peer-reviewed journals, such as Journal of Econometrics, Journal of the Japanese and International Economies, Journal of Risk and Insurance, European Journal of Operational Research and others, on a time series modeling, an evaluation of monetary policy effects, an evaluation of scale/scope economies in insurance industry, and a novel estimation technique which uses the Data Envelopment Analysis. He also has been working on the recent Euro crises, the sovereign credit rating issues, housing price dynamics in Tokyo market and others.

After he earned a BACHELOR'S degree from Tohoku University in 1990, he worked at the Nomura Research Institute, and returned to continue his graduate education at the University of California at San Diego, USA, where he earned a Ph.D in 1997.

He has actively teaching at Seikei University (macroeconomics, econometrics), International Christian University (econometrics), and Economic and Social Research Institute, Cabinet Office, Government of Japan (econometrics).

## Session 2

# Increase in Energy and Commodity Price and Volatility



### Panelist 4

## Chris Salatiello

Professor at Ajou University, Korea

Christopher Salatiello is Assistance Professor at Ajou University School of Law, teaching American law. Mr. Salatiello's work focuses on energy, climate, and compliance policies. Prior to teaching at Ajou University School of Law, Mr. Salatiello worked as a legal advisor for the Ministry of Knowledge Economy on climate change negotiations and energy policy and assisted the Korean government in developing the Emissions Target Management Program as well as the emissions trading law. Mr. Salatiello holds a J.D. from New England School of Law and a B.A. from Clark University.



## **Session 3.**

# **Green Growth and Sustainable Development**

### **(16:30-18:30)**

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#### **Chair**

**Soo Gil Young** Chairman of Presidential Committee on Green Growth, Korea

#### **PRESENTATIONS**

1. **Mikhail Dmitriev** President of Center for Strategic Research Foundation, Russia  
**Sergey Drobyshevsky** Director of Center for Macroeconomics and Finance of the Gaidar Institute  
for Economic Policy, Russia
2. **Adilson de Oliveira** Professor at Federal University of Rio de Janeiro, Brazil
3. **Jisoon Lee** Professor at Seoul National University, Korea
4. **Sung Jin Kang** Professor at Korea University, Korea

#### **PANEL DISCUSSION**

1. **Dong Young Kim** Professor at KDI School of Public Policy and Management, Korea
  2. **Sang In Kang** Senior Researcher of Korea Environment Institute, Korea
  3. **Joo Sueb Lee** Senior Researcher of Global Green Growth Institute, Korea
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## Session 3

# Green Growth and Sustainable Development



Chair

## Soo Gil Young

Chairman of Presidential Committee on Green Growth, Korea

A senior Korean economist, Dr. Soogil Young has been serving as Chairman of the Presidential Committee on Green Growth which he co-chairs with the Prime Minister since July 2010. He also serves as a Co-chair of the Advisory Board for the Global Green Growth Forum sponsored by the Danish government as well as Chairman of the Green Growth Knowledge Forum which is coordinated by the Global Green Growth Institute. Dr. Young worked at four major governmental think tank on economic policies during 1978~1998, including at the Korea Development Institute (KDI) as a senior fellow, and at the Korea Transport Institute (KOTI) and the Korea Institute for International Economic Policy (KIEP) as President of each. During 1998~2000, he served as Korea's Ambassador to the OECD, concurrently serving as Chairman of the Advisory Board on the OECD Development Centre. After working at Kim & Chang, Korea's largest law firm, as a senior advisor for three years, he worked at the National Strategy Institute (NSI), an independent think tank on economic reforms, as President till April 2011. Since the early 1980s, he served on numerous governmental advisory committees, including on four Presidential commissions/committees. In 1994, he was awarded the National Decoration of the *Dongbaik* Order for having coordinated the covert operation to prepare the Presidential Emergency Decree for Real-Name Financial Transactions in August 1993. During 2006~2009, he served as Chairman of the Korea National Committee on Pacific Economic Cooperation (KOPEC). He has written extensively on Korea's development and international challenges. Dr. Young graduated from Seoul National University in Korea with a B.Sc. in chemical engineering and the Johns Hopkins University in the U.S. with a Ph.D. in economics.

## Session 3

# Green Growth and Sustainable Development



### Presentation 1

## Mikhail Dmitriev

President of Center for Strategic Research Foundation, Russia

Mikhail Dmitriev, the former Deputy Minister of Economy and Trade (2000-2004), joined the Center for Strategic Research in June 2004. Until October 2005 he was the Research Director of the Center, and now he holds the position of the President of the Center for Strategic Research. Dr. Dmitriev has an extensive policymaking experience: he was the First Deputy Minister of Economic Development and Trade in 2000-2004, First Deputy Minister of Labor and Social Development in 1997-98, member of the Commission on Economic Reforms of the Government of Russian Federation in 1994-95, member of the Commission on Legislative Proposal of the President of Russia in 1993-94, People's Deputy of the Russian Federation in 1990-1993 (first democratically elected parliament of the Russian Federation). He is a Member of Committee of Experts on Public Administration (CEPA) of the United Nations Economic and Social Council, Commission on Public Administration Reform of the Government of the Russian Federation.

Being a devoted proponent of evidence-based policymaking in Russia, Dr. Dmitriev worked in some of the leading Russian think tanks: Carnegie Moscow Center of Carnegie Endowment for International Peace (1996-97, 1998-2000), and Institute for Economic Analysis (1994-95).

Dr. Dmitriev played a major role in designing Russia's economic reforms in Russia, Dr. Dmitriev worked in some of the leading Russian think tanks: Card preparing reforms proposals in the area of social services. His current research and policy consulting interests include Public administration reforms, Pension reform, Financial sector development, Spatial policy, and Long-term vision of global and Russian economic development.

Dr. Dmitriev studied at the Leningrad Institute of Economics and Finance. He holds Candidate degree from this Institute, and Doctorate degree from the Central Economic and Mathematical Institute of the Russian Academy of Science. He is an author/co-author of a number of books on banking sector, fiscal policy, social policy, public administration and welfare reforms.

## Session 3

# Green Growth and Sustainable Development



### Presentation 1

## Sergey Drobyshevsky

Director of Center for Macroeconomics and Finance of the Gaidar Institute for Economic Policy, Russia

Head of Macroeconomics and Finance Division of the Gaidar Institute for Economic Policy (Moscow, Russia) and Senior Research Fellow at the Russian Academy for National Economy and Public Service under the President of the Russian Federation, Doctor of Economics.

Graduated from the Higher School of Economics (Moscow) and Erasmus University (Rotterdam). In 1996 Sergey Drobyshevsky joined the Institute for Economy in Transition (since June 2010 – Gaidar Institute for Economic Policy) and worked in the Department of Monetary Policy. In 2000-2002 – expert at the Russian-European Centre for Economic Policy.

The main sphere of professional interests: macroeconomics, monetary policy, financial institutions and financial markets, economic forecasting.

Author of 20 monographs and books published in Russia and abroad, more than 100 research papers and articles.

Member of the Expert Council under Government Commission on Economic Development and Integration, Member of the Public Council under the Ministry of Finance, Member of the Monetary Policy Council under the Association of Russian Regional Banks.

## Russian Economy as the Hostage of High Oil Prices

### Russian oil industry in 1992–2011

Oil industry forms the backbone of the Russian economy playing a major role in ensuring revenues of the government budget and the country Ministry of Finance, Member of the Monetary Policy Council under the Association of Russian Regiuring the first decade of the new millennium Russia held the first place by the cumulative value of oil exports (10.5% of world's total).

Until 1992, Russian oil sector formed the background of the USSR oil industry. In the 1980-1990s Russia accounted for about 91% of the USSR oil production. Over the last several decades of the USSR existence the fast growth of oil production and the large-scale oil exports were used as a source of funds supporting the functioning and development of the inefficient socialist economy and raising the standard of living. In 1987, oil production in Russia peaked at 569.5 mln tons. In 1988, oil production remained at about the same level – 568.8 mln. tons. However, the following years saw a steep decline of oil production. In 1996, oil production dropped to 301.3 mln tons or 52.9% of the Soviet maximum level.

The key factors of the Russian oil production decline in the first half of the 1990s were:

- shrinking of the domestic demand due to the market-oriented transformation of the Russian economy;
- the decrease in the actual demand for Russian oil in the former USSR republics and in Eastern Europe caused by the economic slump in those countries and by the mutual trade prices approaching the world market prices;
- the institutional restructuring of the Russian economy as a whole and the oil industry, in particular.

In the second half of the 1990s the situation in the Russian oil industry stabilized and the first half of the 2000s became a period of fast oil production growth.

In 2000-2004 oil production in Russia grew 1.5 times and the annual oil production growth rates in 2002-2004 reached 8.9-11%. The oil production growth was determined by the exports expansion and, in particular, by the building of the Baltic Pipeline System (BPS), by intensification of the green fields development, and by wider investment capabilities of the oil companies resulting from the growth of the world oil prices. Over the next few years the oil production growth rates dropped significantly. In 2006-2007, the annual oil production growth rate was a mere 2.1% while 2008 registered a scale down in oil production. These facts testify to exhaustion of the reserves of oil production growth in the country through intensification of the green field development and to the necessity of undertaking more vigorous steps in developing new oil areas.

In 2009, oil production growth resumed but remained relatively low. In 2011, oil production

reached the all post-reform high of 511.4 mln tons (see Table 1). Putting several large fields on stream in the northern part of the European Russia and in Eastern Siberia as well as the changes in taxation reducing [the overall tax burden](#) on the oil industry, particularly in cases of more efficient operation of producing oil fields and developing new production provinces, had a positive effect on the oil production dynamics.

**Table 1. Oil production and refining in the Russian Federation in 1990-2011**

	1990	1992	1995	2000	2005	2010	2011
Oil production including oil condensate, mln tons	516.2	399.3	306.8	323.2	470.0	505.1	511.4
Oil production growth against the previous year, %	-6.5	-13.6	-3.5	6.0	2.4	2.1	0.8

Source: [Federal State Statistics Service](#), Ministry of Energy of the Russian Federation.

The slowdown in the oil production growth rates that started in the middle of 2000s can be attributed, first of all, to the objective deterioration of the conditions of production. A considerable part of producing fields had entered in the period of decline while new fields in most cases had worse geological and geographical parameters and demanded higher capital, operational and transportation costs.

The market reforms in Russia gave rise to formation of large vertically integrated oil companies incorporating oil production, refining and oil products sales enterprises. The key oil industry transformations happened in 1993-1995 when 11 vertically integrated oil companies and two regional oil companies («Tatneft» and «Bashneft») arose. Over the next years a number of small-sized oil companies were taken over by bigger ones and in the 2000s assets of two large private companies were taken over by the state-run companies («Rosneft» acquired the «YUKOS» assets and «Gazprom» bought out «Sibneft»). As a result the share of the state-run (owned by the federal government) companies in the overall oil production in Russia increased from 7.3% in 2003 to 31.1% in 2011.

The modern oil production structure in Russia is presented in Table 2. In 2011, the five largest Russian companies («Rosneft», «LUKOIL», «TNK-BP», «Surgutneftegaz» and «Gazprom») accounted for 74% of the total oil production in the country. The share of mid-sized companies («Tatneft», «Slavneft», «Bashneft» and «Russneft») was 14.4%. In 2011, the Product Sharing Agreements (PSA) operators produced 3% of the Russian oil. Presently, there are three effective PSA with foreign oil companies. They were signed in 1990: two PSA are being implemented onshore and offshore the Sakhalin Island («Sakhalin-1» and «Sakhalin-2»), and one more in the northern part of the European Russia (the Kharjaga Field in the Nenets Autonomous Okrug). The share of other smaller oil producers numbering over 100 amounted to 8%.

**Table 2. Oil production structure in Russia in 2010-2011**

	Oil production in 2010, mln tons	Share in the total production, %	Oil production in 2011, mln tons	Share in the total production, %
Russia, total	505.1	100.0	511.4	100.0
Rosneft	112.4	22.3	114.5	22.4
LUKOIL	90.1	17.8	85.3	16.7
TNK-BP	71.7	14.2	72.6	14.2
Surgutneftegaz	59.5	11.8	60.8	11.9
Gazprom (including Gazprom Neft)	43.3	8.6	44.8	8.8
Tatneft	26.1	5.2	26.2	5.1
Slavneft	18.4	3.6	18.2	3.6
Bashneft	14.1	2.8	15.1	3.0
Russneft	13.0	2.6	13.6	2.7
NOVATEK	3.8	0.8	4.1	0.8
PSA Operators	14.4	2.9	15.1	3.0
Other producers	38.2	7.6	41.1	8.0

Source: Ministry of Energy of the Russian Federation.

### **Export potential and geography**

Oil is the main export commodity of Russia. In the Soviet Union, the peak of the Russian oil exports fell on 1988 when net oil and oil products exports amounted to 291.6 mln tons. However, it should be noted here that half of the Russian oil exports of that period was channeled to the former republics of the USSR at internal prices that were much lower than the world prices. In this way Russia in fact served as a donor to the economies of those countries. After the dissolution of the USSR, oil and oil products exports to the former republics of the USSR fell sharply. The fall stemmed from the contraction of the actual demand in those countries accompanying the transformation-induced economic slump and by an increase in the imported energy prices.

As a consequence, the first half of the 1990s saw a significant reduction of the Russian oil exports. Nevertheless, as early as 1996 the oil and oil products exports started to grow and in 2000s surpassed the pre-reform level. In 2011, the net oil and oil products exports reached 370.7 mln tons and became 1.5 times higher than the 1990 level. Subsequently, the share of the net oil and oil products exports in oil production increased from 47.7% in 1990 to 72.5% in 2011 (Table 3).

The world oil prices increase in the 2000s brought about a significant growth of the oil industry export revenues. In 2011, the total revenues from exporting crude oil and basic refined oil

products (motor gasoline, diesel fuel, and heating oil) reached \$US 259.5 bln which is the record level for the entire post-reform period (Table 3). For comparison: the minimum level of oil exports revenues was registered amid the world oil prices drop in 1998 when the exports revenues went down to \$US 14 bln while the price of the Russian Urals crude fell to \$US 11.8 per barrel.

In 2011, in response to the higher world oil and gas prices the share of fuel and energy commodities in the Russian exports reached 69.2%, including 34.7% of crude oil (Table 4).

**Table 3. Crude oil and refined oil products exports revenues in 1995-2011, \$US bln**

	<b>1995</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2005</b>
Revenues from exports of crude oil and basic refined oil products	16.4	21.1	14.0	18.8	34.9	112.4
	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
Revenues from exports of crude oil and basic refined oil products	140.0	164.9	228.9	141.2	193.9	259.5

Source: estimates based on the data by Federal State Statistics Service.

**Table 4. Value and ratio of energy resources exports in 2005-2011**

	<b>2005</b>		<b>2010</b>		<b>2011</b>	
	<b>\$US bln</b>	<b>%*</b>	<b>\$US bln</b>	<b>%*</b>	<b>\$US bln</b>	<b>%*</b>
Energy resources, total	154.7	64.1	267.7	67.5	357.2	69.2
Including crude oil	83.8	34.7	134.6	34.0	179.1	34.7
Natural gas	31.4	13.0	47.6	12.0	63.8	12.4

\* % of the total Russian exports.

Source: Federal State Statistics Service.

An analysis of the Russian oil exports long-term data demonstrates an increase of the refined oil products share (Table 5). That share in the net crude oil and refined oil products exports grew from 18.2% in 1990 to 34.3 % in 2011. Heating oil used in Europe as feedstock for further refining and diesel fuel formed the main part of the refined oil products exports.

The above data provide evidence of a significant strengthening of the export-oriented trend in the Russian oil industry in comparison with the pre-reform period. However, one should have in mind that this is associated not only with the increase in the absolute export volumes but also with a significant shrinking of the domestic demand due to the market-oriented transformation of the Russian economy.

The Russian oil exports geography changed radically: the share of the non-FSU countries sharply increased while the share of the FSU countries decreased



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significantly. In 2011, the non-FSU countries accounted for 89.1% of the Russian oil exports and the FSU countries - for 10.9%.

On practice, this meant a growing importance of the EU as a market for Russian oil and refined oil products. During 2000s EU and Turkey absorbed about 80% of Russia's oil exports. Share of Russia on the EU market increased from 21% in 2000 to 31.5% in 2008 and continued to grow thereafter. Currently the EU market generates 17% of global demand for oil.

**Table 5. Proportions of oil production, consumption and export in 1990-2011**

	1990	1992	1995	2000	2005	2010	2011
Crude oil, mln tons							
Production	516.2	399.3	306.8	323.2	470.0	505.1	511.4
Exports, total	220.3	137.7	122.3	144.5	252.5	250.4	244.6
Exports to non-FSU countries	99.7	66.2	96.2	127.6	214.4	223.9	214.4
Exports to FSU countries	120.6	71.5	26.1	16.9	38.0	26.5	30.2
Net exports	201.5	127.0	113.8	138.7	250.1	249.3	243.5
Domestic consumption	269.9	231.4	150.4	123.0	123.1	125.9	140.7
Net exports as % of production	39.0	31.8	37.1	42.9	53.2	49.4	47.6
Refined oil products, mln tons							
Exports, total	50.6	43.0	47.0	61.9	97.0	132.2	130.6
Exports to non-FSU countries	35.0	25.3	43.5	58.4	93.1	126.6	120.0
Exports to FSU countries	15.6	17.7	3.5	3.5	3.9	5.6	10.6
Net exports	44.8	40.9	42.6	61.5	96.8	129.9	127.2
Crude oil and refined oil products, mln tons							
Net exports of crude oil and refined oil products	246.3	167.9	156.4	200.2	346.9	379.2	370.7
Net exports of crude oil and refined oil products as % of oil production	47.7	42.0	51.0	61.9	73.8	75.1	72.5

Source: Federal State Statistics Service, Ministry of Energy of the Russian Federation, Federal Customs Service, author's estimates.

Crude oil exports continued to prevail in the oil exports structure accounting for 65.7% of the total crude oil and refined oil products exports in 2011. However, physical volume of oil exports increased

by slightly more than 1.5 times, whereas exports of refined products increased by over 2.1 times. During the last years Russia exported 50-55% of all domestically refined oil and the total volume of exports of refined products equaled 986 mln tons to an amount of 383 bln \$US.

Heating oil prevailed in the export structure of refined products. It represents 30% of all oil refined products' output in Russia by comparison to no more than 10-15% in the USA and the EU. Share of diesel fuel in exports of oil refined products in 2010 was 31%, whereas share for motor gasoline - only 2.3%. Only 8% of all production of the motor gasoline was exported due to combination of high domestic demand, weakening demand in Europe and a poor quality of Russian fuel. Tax incentives also played a role (export tariff on gasoline was 1.5 higher than on black products).

Russia's ability to become the world's largest exporter of oil is underpinned by the peculiar structure of its domestic energy consumption. Share of oil in the Russia's fuel balance is higher than in China but much lower than in India, Brazil and in high-income countries, including Western Europe which became the major market for Russia's oil and oil products (table 6).

**Table 6. Structure of energy consumption of world's largest consumers, 2010 (%)**

Country	Oil	Gas	Coal	Other
China	17.6	4.0	70.5	7.9
USA	37.2	27.2	23.0	12.7
Russia	23.0	31.4	16.5	29.1
India	29.7	10.6	52.9	6.8
Japan	40.2	17.0	24.7	18.1
Germany	36.0	22.9	24.0	17.1
Canada	32.3	26.7	7.4	33.6
Brazil	46.1	9.4	4.9	39.7
France	33.1	16.7	4.8	45.4

Source: BP.

In spite of very high growth of Russian economy during the first decade of 2000-s, domestic consumption of energy, including oil, stagnated. During this period most of the inefficient and outdated soviet era park of vehicles and aircrafts had been replaced by modern and more fuel efficient models. In spite of very fast growth of the number of motor vehicles (by 8% a year) domestic consumption of motor gasoline was increasing by just 1.5% annually due to fast fuel efficiency improvement.

Being the third largest producer of energy in the world after USA and China, Russia still remains energy inefficient and leads the list of the least efficient big energy consumers (table 7). Therefore, there is still a potential for continuous economic growth without growth in domestic energy consumption.

**Table 7. Energy consumption per unit of GDP on PPP, 2008**

Brazil	China	India	Russia	Canada	Germany	Japan	USA
0.15	0.19	0.14	0.42	0.25	0.14	0.14	0.19

Source: BP.

However, with regards to oil, this trend may not be sustained in the longer run. Fast modernization of the motor vehicles park during 2000s reduces potential for further catching up in fuel efficiency, whereas expected structural shifts in favor of oil-consuming road and air traffic are still very substantial. Motor fuel consumption per capita is still relatively low by comparison to advanced economies (Table 8), and is likely to increase in the future.

**Table 8. Fuel consumption per capita in 2009, kg**

	Russia	USA	Western Europe	Japan	China
Diesel (kg)	216	673	655	540	-
Motor gasoline (liters)	218	1257	524*	-	46

\*Estimate.

Source: INSOR.

Inefficiencies and technological backwardness are not confined to domestic consumption of energy but also to downstream production. As a whole, Russia's oil and gas industry has a strong upstream bias. Russia's share of global oil and gas production is 12%, its share of global refining capacity is 6%, share of ethylene production – 2%, and share of petrochemical production is just 1%. Whereas Russia is the largest exporter of upstream products – oil, gas and oil refined products, it remains net importer of petrochemical and gaseochemical products.

Majority of Russian oil refineries were constructed in 1940s-1960s. The most recent one – Achinsky refinery was opened in 1986. Until recently, modernization of the industry proceeded slowly. Certain improvements in quality of refined products did not allow the industry to reduce the gap with the advanced economies. On the contrary, it continued to widen. The depth of oil processing in Russia continuously remained below 70% against 90-95% in USA and Canada. The ratio of secondary to primary refining capacity in Russia remained at 70%, against the world average 90%, and 150% in the USA. While the share of catalytic cracking in Russia was only 6.3%, in Western Europe it reached 15.5%, and in the USA 36%. Nelson index, which characterizes technological complexity of refining, stood at 4.5 in Russia compared to 5 as world average and 10 for the USA. Share of light products in Russian refiners' basket was only 58%, while in Europe in it was 68% and in the USA – 75%.

Another indication of Russia's downstream technological weakness is its overreliance on oil in processing. Only 3% of natural gas production is used for processing. Share of gas in processing (less

than 25%) is much lower than the world average (40%). The share of gas in Japan and Western Europe is about 80%, and in USA and Canada – at about 70%.

The downstream technological backwardness comes at high cost to Russian exporters. International prices for white products are usually 25-40% higher than oil prices. But the quality of Russia's refined products is so poor that in Europe they are used mainly as inputs for the Eastern European refineries to produce lighter and better quality fuels with additional margins. Therefore, export prices for a basket of Russia's refined oil products remained below or equaled the prices of Urals for most of the 2000s (Table 9).

**Table 9. Average export prices for the basket of Russia's refined oil products and for the Urals.**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Basket of oil products, \$US/ton	148	149	181	234	348	427	466	679	388	529	725
Urals, \$US/ton	152	154	175	237	331	412	471	699	422	546	755
Price ratio of the basket of oil products to Urals	0.972	0.968	1.037	1.028	1.050	1.036	0.990	0.970	0.920	0.969	0.960

Source: Rosstat.

Russia's exports of refined oil products to Europe served as a mere substitute for exports of crude oil. These exports would have been uneconomical unless for the distorted domestic demand structure and for the export taxation system which helped to sustain them. Until recently, export duties on crude remained at much higher level than export duties on dark/heavy products. Without tax incentives domestic prices for diesel fuel would have declined and prices for motor gasoline would have increased.

With the introduction in 2004 of differentiated export taxation of crude oil and oil products, export duty for heavy/dark products was set at 38% of duty on oil, and by 2011 it was risen to 46.7%. For light/secondary refined products (gasoline, kerosene and diesel) export duty was set at 73% of duty on oil and later reduced to 67%. In May 2011 export duties for straight-run gasoline were risen temporarily to 90% to subdue domestic gasoline prices.

In 2004 average export duty of the oil products basket was set at 58% of the duty on crude oil, equivalent of 20 \$US per ton. This difference compensated downstream producers extra transportation costs from Russian refineries to Europe by rail and sea by comparison to oil pipeline tariffs. By the end of the 2000s Russian refineries were capable of maintaining margins 5 to 8 times higher than

European average.

Preferential treatment of exports of diesel and dark products was intended to cross-subsidize domestic gasoline prices and reflected dramatic structural shifts in domestic fuel consumption (Table 10). As we can see, at the beginning of transition to market economy diesel fuel dominated in motor fuel consumption. It reflected the previous trend of conversion of trucks and buses to diesel, promoted by Soviet planners. However, during transition to market economy this trend was reversed, mainly due to rapid increase in private car ownership which was strongly biased towards gasoline. By 2005 share of gasoline consumption caught up with the share of diesel, whereas production structure remained almost unchanged. Share of heating fuel, which included dark products, declined only marginally – from 42% to 38%. This shift created a considerable structural surplus of diesel fuel and heavy refined products. On the contrary, supply and demand of gasoline were neatly balanced. In 1991 the share of gasoline in fuel production equaled its share in consumption. But by 2009 it fell to almost ½ of its share in consumption.

**Table 10. Structure of fuel production and domestic consumption in Russia (%)**

	1991		1995		2000		2005		2009	
	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption	Production	Consumption
Motor gasoline	18.0	17.9	19.7	20.6	19.8	28.0	21.5	32.4	19.8	36.4
Diesel	33.2	30.0	33.1	22.5	35.8	31.0	37.2	32.0	37.4	37.0
Jet fuel	6.8	7.5	6.3	6.9	4.9	6.9	5.4	8.8	4.7	8.1
Heating fuel	42.0	44.6	46.9	50.0	39.5	34.1	35.9	26.8	38.1	18.5
	100	100	100	100	100	100	100	100	100	100

Source: Info TEC-CONSULT.

By a fortunate coincidence, these shifts in Russia's domestic market were accompanied by the opposite shifts in the European market, making for the time being Russia and the rest of Europe almost an ideal export-import match in oil refined products. As Table 11 indicates, in Russia ratio of diesel to motor gasoline consumption declined from 1.68 in 1991 to just about 1 since 2005. In Europe, partly due to EU policy of dieselization, the ratio moved the other way round – from 1.17 in 1995 to 1.25 and above since 2005 and is projected to reach 1.31 by 2015. Global financial crisis did not reverse but rather accelerated this shift in European fuel consumption. Initially both diesel and motor gasoline consumption in Europe declined. However, decline in gasoline consumption was deeper and faster (in the IV quarter of 2008 it fell by about 10 % to the same quarter of 2007) and it did not recovered since

then. Diesel consumption increased in late 2008 and declined by about 5% in late 2009. But the general emphasis on diesel consumption became even stronger.

Growing consumption of diesel fuel leads to structural deficit of this product on European market. Partly this demand is being met by expanding capacity of hydro-cracking and hydro-desulphurization in local refineries. But partly it needs to be covered by import. By the end of 2000s Europe was the world's largest importer of diesel fuel (nearly 50 mln tons) and Russia became the world's largest exporter (close to 30 mln tons). When in the first half of 2010 European production of diesel fuel declined by about 0.4 mln barrels a day as compared with the same period of 2009, Europe increased import of diesel fuel by more than 15%.

**Table 11. Ratio of diesel to motor gasoline consumption in Russian and European markets.**

Markets	1990	1995	2000	2005	2010	2015*
Russian	1.68**	1.09	1.11	0.99	1.02***	-
European	0.7	1.17	1.20	1.25	1.26*****	1.31

\* Forecast.\*\*1991.\*\*\* 2009.\*\*\*\*\*Estimate.

Source: INSOR, Info TEC-CONSULT, author's calculations.

With regard to black oil (mazut) Russia's domestic consumption was dwindling rapidly and export potential in 2007 was at 15 mln tons. However, by that time European import of this product was already much lower (8 mln tons). Since then, European consumption declined considerably (by about 15% in 2007-2010). So, this market represents unfavorable trend for Russian exporters, thus creating incentives for deepening the refining and reducing the output of heavy products.

### **Long-term projections for Russia's oil**

In 2010 Russia surpassed Saudi Arabia and became world's largest exporter of crude oil. However, contrary to its behavior on gas market, Russia was never engaged in quota system to manipulate market prices. Russia's oil production conditions are different from the leading OPEC members. In extreme climatic conditions of Siberian oil fields, well conservation becomes costly and rather uneconomical in terms of production control.

Export capacity and investment geography of oil production is strongly dependent on access to infrastructure and remains sensitive to transportation costs. Being located deep in Russia's mainland, most of the oil fields were relying on access to lengthy and expensive state owned pipeline system. During 2000s, this capacity was not sufficient to absorb the growing production and it partly shifted to railroad in spite of relatively high tariffs. Transportation of oil by railroad increased from 46 mln tons in 2006 to 60 mln tons in 2010 but declined by more than 10% in 2011 and is expected to decline by more than 40% by 2020 due to increasing capacity of pipeline infrastructure.

Recently, however, production growth slowed down to 1-2%, whereas infrastructure capacity was expanding both in the Western and in the Eastern direction (Table 12). By the end of 2012 Russia

will create additional 1.6 mln barrels a day of infrastructure capacity for oil export. For example, export from Ust-Luga port on the Baltic Sea is sustained at 300 thousand barrels a day – at half current capacity, which can later be expanded to 1 mln barrels a day. Export through old Soviet Druzhba pipeline system to Eastern Europe (1.3 mln barrels a day) is likely to decline. But export capacity of Novorossiisk port on the Black sea can be expanded further.

**Table 12.** Largest international pipeline construction projects with Russian participation (EU market)

<b>Project</b>	<b>Route</b>	<b>Annual capacity, mln tons</b>	<b>Year of completion</b>
Baltic pipeline system	Yaroslavl –Primorsk (port)	74	2006
Baltic pipeline system 2	Unecha (Bryansk region) –Ust-Luga(port)	38	2011
Caspian Pipeline Consortium – 2	Tengiz (Kazakhstan) –Novorossiisk (port)	67	2014
Burgas-Alexandroupolis	Burgas (port)-Alexandroupolis (port)	35	Suspended
Refined oil products pipeline “North”	Vtorovo (Vladimir region) – Primorsk (port)	8.4	2007
Refined oil products pipeline “South”	Syzran (Samara region) – Novorossiisk (port)	8.7	2013

Source: VTB.

In the Eastern direction pipeline capacity until recently was non-existent but now expands rapidly. Until recently, the only export possibility was by rail. Now the construction of the VSTO (“East Siberia - Pacific Ocean”) pipeline to the Far East and its envisaged expansion allows to begin exploration of the new oil fields in remote areas of Eastern Siberia and the Far East. For the moment, VSTO export capacity from Kozmino is about 330 thousand barrels a day but by late 2012 it will reach 600 thousand barrels and will be expanded to 1 mln barrels afterwards. Annual capacity of VSTO is equivalent to 30 mln tons with the capacity of the Chinese junction at 15 mln tons. The expected full annual capacity of VSTO will be 80 mln tons which is equivalent to 1/3 of total oil export from Russia in 2010. It will enable to shift more than 15 mln tons of oil exported in the Eastern direction from railroad to the pipeline.

With infrastructure constraints being eased both in the East and in the West, tax regulations will be the key determinant of future production, export and investment decisions. Tax policy is crucial to understanding longer term future of Russian oil exports. Before and during global financial crisis tax system effectively captured rent fluctuations and capped profits of oil producers (table 13).

**Table 13.** Net profits of major Russian oil producers (in % of sales)

International Preparatory Conference for the 2013 G20 Russia Summit  
International Monetary System, Energy and Sustainable Development

	2008	2009	2010	2011
NOVATEK	29.0	28.6	34.2	33.3
Surgutneftegas	26.4	22.8	21.4	30.9
Gasprom	23.5	26.5	27.7	26.7
TNK-BP	10.2	14.7	16.5	14.8
Rosneft	16.1	13.9	17.0	13.5
Gaspromneft	13.6	12.4	9.5	12.0
RussNeft	9.1	15.1	6.5	10.9
Tatneft	2.0	15.0	10.4	10.0
LUKOIL	8.5	8.8	8.7	7.7
Bashneft	8.2	6.0	11.3	7.1
Slavneft	11.9	6.6	5.0	0.3
PSA operators	12.7	10.4	15.8	12.6
Other producers	11.9	9.9	12.0	13.0
Total	15.3	16.3	16.7	16.0

Source: NeftRosii, No 9, September 2012.

Table 14

**Tax payments of oil and gas companies.**

	2008		2009		2010		2011	
	Bln\$US	% of sales	Bln\$US	% of sales	Bln\$US	% of sales	Bln\$US	% of sales
Rosneft	38.8	56.3	22.1	47.2	30.3	48.1	46.6	50.7
Gasprom	56.9	43.1	35.0	37.1	40.0	33.8	38.9	25.9
LUKOIL	38.2	35.5	21.4	26.4	30.1	28.7	38.7	29.0
TNK-BP	29.3	56.6	15.8	45.5	20.9	50.9	31.7	52.6
Gaspromneft	14.0	41.4	8.6	35.7	12.6	38.5	17.5	39.6
Surgutneftegas*	10.0	45.6	6.2	39.3	8.3	42.4	10.9	43.5
Tatneft	9.1	51.1	5.3	44.2	7.5	48.7	10.5	51.1
Bashneft	3.2	65.3	1.8	26.9	4.6	34.6	7.4	46.0
Slavneft	4.3	72.9	2.2	57.9	2.8	70.0	2.9	71.5
Russneft	3.6	65.5	2.3	43.4	3.1	44.9	2.8	51.5
NOVATEK	1.3	41.9	1.0	35.7	1.5	39.5	2.5	40.9
PSA operators*	3.0	55.9	4.2	48.2	5.9	52.0	10.6	53.4
Other producers*	4.3	59.2	5.2	51.0	11.0	55.1	14.7	56.6
Total	216.1	46.4	131.0	37.9	178.5	39.3	235.7	39.1

\*Estimate

Source: NeftRosii, No 9, September 2012.



In terms of overall tax burden on oil producers, Russian state is not among the 10 heaviest tax collectors. By comparison to 2008, gross taxes in percent of total sales of oil and gas companies even declined (Table 14). But with regard to oil production as such, at an oil price of 100 \$US per barrel existing tax system withdraws approximately 75% of the price of oil. Norway collects 77 %. New tax regime 60-66-90, introduced since in October 2011 was intended to shift tax burden downstream, towards oil products. According to McKinsey estimates, in the short run tax burden per barrel of exported oil will be reduced by 3.8 \$US. For the budget it would mean gross revenue loss of about \$US 7 bln a year which will be partially offset by \$US 4 bln extra revenues on exports of refined oil products.

As one of the senior THK-BP executives pointed out, the new system generates for the old fields in Western Siberia net back 8-9 \$US per barrel (net of taxes and pipeline tariff). This may do for the old fields, but makes uneconomical new exploration in remote regions as well as marginal extraction in the exhausted oil fields.

The existing taxation system is based on royalty (i.e. linked to volumes of production rather than profits) and fails to fully deduce capex from the tax base. In this system profitability of the new exploration vests on exemptions which are granted on case by case basis. For example, in 2010 22 oil and gas fields in Eastern Siberia were granted reduced or zero rates on export duties. However, during the same year zero rates were revoked for the three highly important newly developed fields - Vankor (Rosneft), Verkhnechonsk (TNK-BP), and Talakan (Surgutneftegas), whereas duty reductions were revoked for 6 other fields (for at least one of them reduced duty was restored in 2012).

These individual decisions may play a crucial role in the long-term future of oil production in Russia. Being first or second in the world as a producer of oil, Russia lags behind the major producers in terms of reserves to production ratio. National oil reserve statistics is intransparent and the volume of reserves by international classification remains debatable. However, most of estimates converge at about 10 bln tons. This sets reserves to production ratio at about 20 – much lower than the world's average (46) and OPEC's average (85).

However, reserves defined by Russia intransparent classification (ABC1 and C2 reserves) are estimated at 22 bln tons - more than twice the volume of international reserves. According to McKinsey, roughly 50% of reserves by Russian classification can be extracted on profitable basis under current tax regime. Of the remaining half 4 bln are located in non-developed fields (90% of total reserves in non-developed fields) and 6.7 bln – in developed fields (40% of remaining reserves in developed fields).

Development of the new fields is indispensable for sustaining current production levels in the longer run. During 2007-2010 production in the old fields declined by an average annual rate of 0.6%. In 2009-2010 production in Yamalo-Nenetsk okrug in Western Siberia was declining by roughly 7% a year. During this period production growth which in 2010 brought Russia to the top of global league of oil producers was achieved only due to the opening of the three large new fields in East Siberia (Vankor, Talakan and Verkhnechonsk). Together they provided over 20 mln tons in 2010.

It is estimated that by 2020 newly developed oil fields of the new provinces will provide about 20% of total oil production and roughly 5% of production will be generated by the newly developed fields of the old provinces.

Energy Strategy of the Russian Federation for the period until 2030 contains the following production indicators for oil and oil refined products (Table 15). This scenario assumes a steady rise in production throughout the period. Since the adoption of the Strategy actual production has already surpassed the projections for mid-2000s. Therefore, the Ministry of Economic Development revised its scenarios.

In Table 16 we provide the summary of the updated scenarios with additional adjustments for the period until 2020 made by the experts of the Center for Strategic Research with consideration of the recent data on supply, demand and investments. These scenarios do not envisage any considerable investments in expansion of production of oil and oil refined products. Export of crude oil is supposed to decline. Geography of production will also change only marginally. An increase of oil production by about 12 mln tons is expected in Siberia and Far East, whereas in all other regions it will stagnate or decline.

However, new field development needed to maintain current levels of production will require investments of about 150 bln \$US and up to 50% of capex will have to be compensated by tax rebates. Another 50 bln \$US may be needed as investments in oil refining to insure full compliance with the European environmental requirements for fuel which were endorsed in 2008 as part of Russia's mandatory national technical regulations.

**Table 15. Forecast of annual production of oil and oil refined products in the Energy Strategy of the Russian Federation, mln tons a year**

	<b>2008 (actual)</b>	<b>2015</b>	<b>2020</b>	<b>2030</b>
Crude oil	488	486-495	505-525	530-535
Oil refined products	237	232-239	249-260	311
Depth of oil refining	70%*	79%	83%	89-90%

\*Estimate.

Source: <http://www.energystrategy.ru>

**Table 16. Forecast of annual production of oil and oil refined products, CSR baseline scenario, mln tons a year**

	<b>2010 (actual)</b>	<b>2015</b>	<b>2020</b>
Crude oil	505	507	510
Crude oil export	250	242	246
Oil refined products	249	257	256

Source: Center for Strategic Research

In these scenarios, share of Europe as an export market for Russia's oil and gas is likely to

decrease to allow relocation of exports towards Asian markets. These expectations are not inconsistent with projected demand in Europe.

According to recent forecasts, net import of energy by Russia's main customer, the EU, will increase by over 14% during 2010s and will begin to decline afterwards (table 17). Gas import is expected to increase by about 25%. Net import of coal may go up by about 25% until 2020 and will decline thereafter. However, net import of oil is expected to increase in 2010s by less than 10% and will decline later on.

Recession in the EU has already caused liquidation of refining capacity of about 3-5 mln barrels a day. European margins continue to decline due to weak demand and higher feedstock costs, partly explained by the shift from the Libyan supplies. The operating environment is unlikely to improve in the near future. Some of the majors are completely exiting or reducing exposure to Europe. The expected additional capacity reduction may reach 7 mln barrels a day. More competitive refining capacity is emerging in the Middle East and in Asia. In the longer run, net imports of oil refined products are expected to be negative and will decline.

However, European oil refining remains highly volatile. European refineries are modernizing production to increase output of diesel fuel. As a result, heating oil production declines and regional deficit of low sulphur heating oil in North-Western Europe (total volume of the market – 1 mln tons a month) has reached 200-300 thousand tons a month.

**Table 17. Net imports to the EU, mln tons of oil equivalent**

	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>
<b>Crude oil</b>	<b>579</b>	<b>616</b>	<b>630</b>	<b>619</b>	<b>597</b>
<b>Refined oil products</b>	<b>1</b>	<b>-1</b>	<b>-6</b>	<b>-10</b>	<b>-15</b>
<b>Natural gas</b>	<b>293</b>	<b>328</b>	<b>351</b>	<b>361</b>	<b>364</b>
<b>Coal</b>	<b>117</b>	<b>134</b>	<b>145</b>	<b>140</b>	<b>129</b>

**Source: European Commission**

On the contrary, Russia's oil export from the fields in Eastern and Western Siberia and in the Far East to Asian and Pacific markets, including China and South Korea, has a tangible potential for expansion (Table 18). By 2020 it may increase 2.5 times and by 2030 –almost 3.5 times. Export of oil refined products may reach 30-35 mln tons by 2020 and 40 mln tons by 2030. In this rather radical scenario East Asia will rival Europe as export destination for Russian crude oil, absorbing in the longer run roughly 50% of total Russian export of crude oil and up to 25% of export of oil refined products.

**Table 18. Projections for Russian oil export to Asian and Pacific markets, mln tons a year**

	<b>2010 (actual)</b>	<b>2020</b>	<b>2030</b>
<b>Asian-Pacific markets</b>	<b>38</b>	<b>100-110</b>	<b>112-130</b>
<b>South Korea</b>	<b>9.8</b>	<b>20-25</b>	<b>30-35</b>

Source: Neft Rosii, No 9, September 2012.

### **Oil industry input into the country's economy**

A number of approaches are being applied to make an assessment of the oil industry contribution to the GDP. Rosstat calculates value added by type of activity. Minerals extraction at the level of 10.7% of GDP (2011), including energy resources at 8.8% of GDP (including production of natural gas and coal). The following factors shall be taken into consideration to arrive at the overall estimate.

First, the Rosstat assessment is based on the standard approach to measuring value added in the basic price (i.e. net of taxes on products, export duties, excise taxes etc.). For the oil industry it would make sense to calculate added value in market prices that reflect the industry full contribution to the GDP. Second, the borderline between value added in production and transportation of crude oil, refined oil products and gas is rather arbitrary. The purchase price and the producer price ratio varies significantly from 2.2 times in 2000 to 0.9 times in 2008, and 1.3 times in 2011. In view of the above it would be appropriate to view the oil industry as an integration of such activities as oil production, refining and oil products transportation. Third, a part of value added is transferred from the oil sector through the transfer prices mechanism and formally registered in the trade and intermediation sector.

Assessment of the oil and gas industry contribution is based on the following components:

- crude oil production;
- domestic consumption of crude oil;
- crude oil exports;
- export and domestic supply of refined oil products.

The final sales value was determined for each component of value added. Export supplies prices were used with regard to export; the purchase price and the producer price were used with regard to the domestic market. Changes in the oil and gas sector share are very sensitive to the pulsations of the price environment. The objective trends in changes in the oil and gas sector role can be identified through an evaluation of its characteristics under comparable conditions.

The evaluation results (see Table 19) demonstrate that when an evaluation is performed on the current price basis, against the background of favorable external and internal environment in the second half of the first XXI century decade, the share of the oil industry GDP was decreasing from 25.6% (in 2005) and reached its minimum of 18.8% as a result of the 2008-2009 crisis. Within the

next two years the share of the oil industry GDP was, on average, at the 22.7% level, following the demand restoration and the price increase. At the same time, calculations at the constant price basis demonstrates that the minimum share of the oil industry in the Russian economy was registered in 2008, followed in 2009 by a sizable growth of the oil industry GDP share (in practical terms to the 2006 level). In 2010-2011 this indicator started going down again and by the end of 2011 reached its low for the entire evaluations period.

**Table 19. Evaluation of the oil industry share in the Russian GDP**

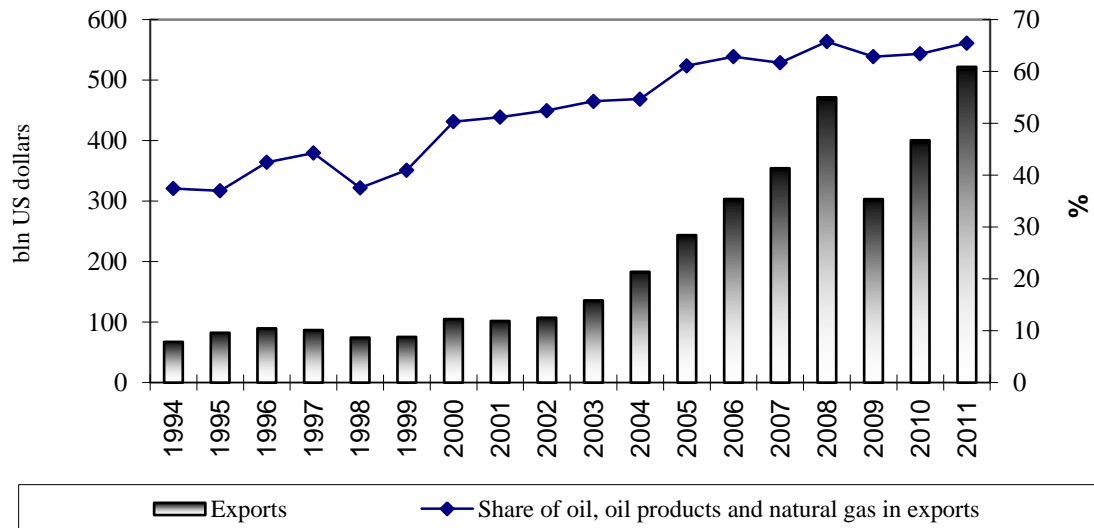
	<b>Oil industry share in the GDP</b>	<b>Proportion of crude oil and refined oil products exports to the GDP</b>	<b>Share of the oil industry taxes in the GDP</b>	<b>Oil industry share in the GDP in the 2005 prices.</b>
2005	25.6	15.6	–	25.6
2006	22.4	14.4	–	24.1
2007	22.8	12.8	–	23.1
2008	21.6	17.2	11.5	21.6
2009	18.8	11.6	8.2	23.7
2010	22.1	13.9	9.6	23.1
2011	23.3	15.5	11.5	22.2

Source: authors' estimates based on Rosstat and Central Bank of Russia data

An important factor of an analysis of the oil industry contribution to the Russian Federation economy is comparing it to the oil industry share in the USSR economy during its last years. Unfortunately, evaluation of the oil industry contribution to the GDP of the Soviet period is extremely difficult to perform for lack of information on average crude oil and refined oil products prices. Besides, exports were dominated by supplies to the Warsaw Pact and the [Council for Mutual Economic Assistance \(CMEA\)](#) countries at prices different from the world prices. Our estimates show that in 1980–1990 the share of the oil industry in the GDP of the USSR was, on average, about 13.3%. While the share of the domestic crude oil and refined oil products market in the GDP roughly corresponded with an average value of a similar indicator for 2000-2011 and remained within the interval of 6-7% of the GDP the share of export revenues was much lower. An attempt to recalculate exports of crude oil and refined oil products at the average world prices of the time results in arriving at the oil industry GDP share of about 21%. In this manner, operating within the framework of the declared approach, we produced rather close estimates of a hypothetical contribution of the oil industry in the GDP of the USSR and the GDP of the Russian Federation in 2005-2011.

### Effect of the energy price changes on the Russian balance of payments

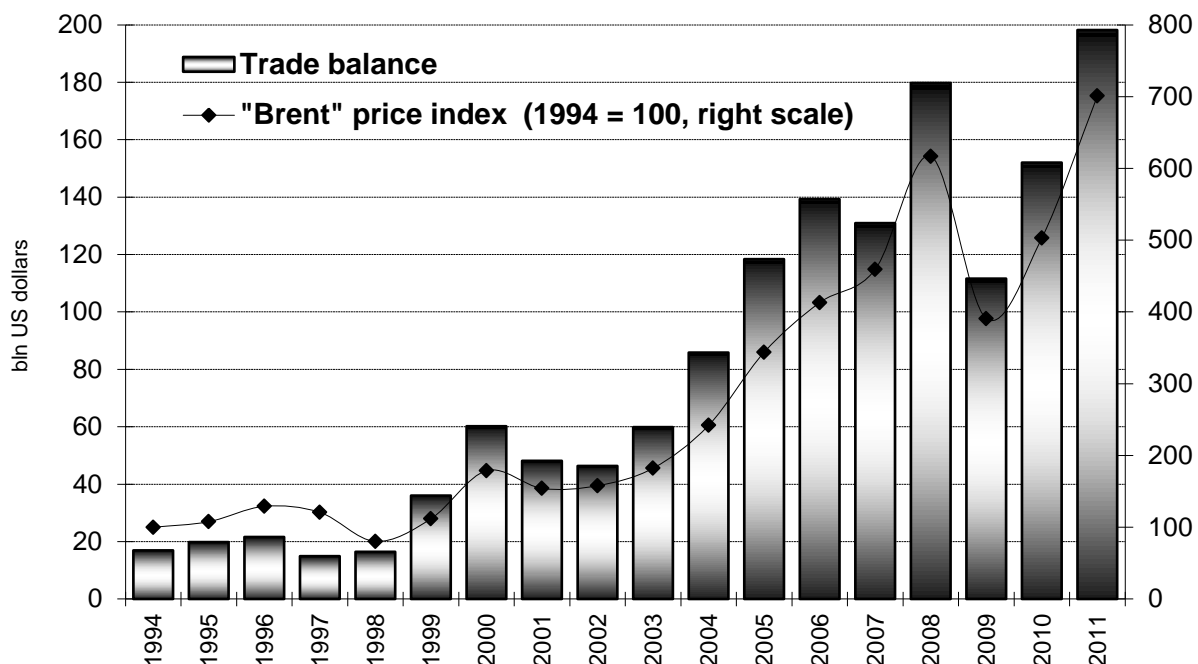
Changes in the trade balance that to a large extent are caused by movements of energy prices on the world market serve as the key factor defining the current account value. Fig. 1 shows that the share of crude oil, refined oil products and natural gas in the 1990-2011 exports was growing continuously. Contraction of the hydrocarbons share in exports happened only in the periods of falling prices.



Source: Central Bank of the Russian Federation.

*Fig1. Dynamics of the commodities exports and the Fuel and Energy Complex share in 1994 – 2011.*

It should be noted here that the growth of prices for the main Russian exports items remains to be the key factor of retaining the surplus of the current account of the Russian balance of payments. Fig. 2 demonstrates that the average annual price of Brent crude increased almost seven times (in \$US) from 1994 to 2011. A close relationship between the oil prices and the Russian trade balance is evident.



Source: Central Bank of the Russian Federation, International Financial Statistics.

*Fig 2. Russian trade balance and the world oil prices index in 1994–2011.*

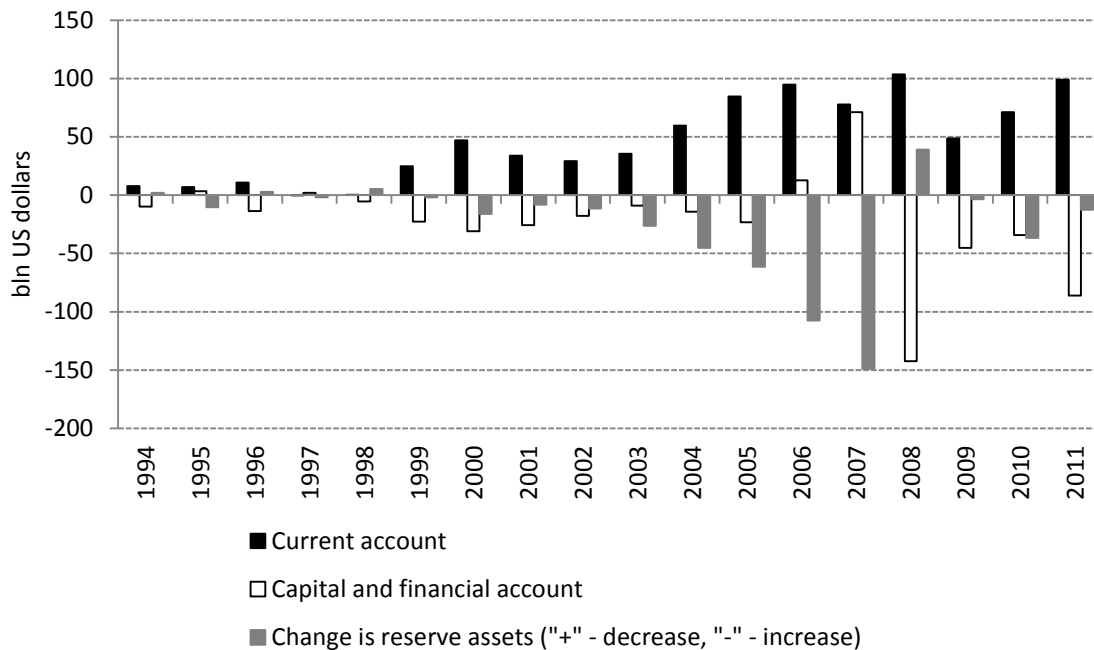
Overall, the growth of prices for the Russian exports items results in an increase in the real effective ruble exchange rate and in earnings of the economic agents in the Russian Federation. Those factors are conducive to the Russian export growth and, consequently, to the contraction of the size of the current account of the Russian balance of payments. Indeed, in 2011 Russian import of goods grew almost 6.5 times against 1994. Import was going down only in the periods of economic crisis in 1998 – 1999 and 2008 – 2009. Which means that changes in the ruble real effective exchange rate bring about growth of the current account of the balance of payment even under meaningful wavering of the terms of trade.

As to the effect of the energy prices evolution on the capital and financial accounts certain components of the financial account of oil prices do produce a material effect. The research done in the [Institute for the Economy in Transition](#)<sup>59</sup> demonstrates that an increase in the Brent crude price stimulates direct investment into Russia and from Russia to other countries. However, no firm correlation between the size of the capital and financial accounts was identified.

It will be noted that the dynamics of the capital and financial accounts is to a large extent influenced by the monetary policy of the Central Bank of the Russian Federation. Under the established terms of trade it is the exchange policy of the monetary authorities that to a large extent defines the size of the capital and financial accounts. It will be recalled that in accordance with the methodology of forming the balance of payments the sum total of the capital and financial accounts

<sup>59</sup>See S. Drobyshevsky, P. Trunin (2006) Interaction of Capital Flows and the Key Macroeconomic Indicators in the Russian Federation. Proceedings of the Institute for the Economy in Transition, №94P.

and the current account should be zero.



Source: Central Bank of the Russian Federation.

*Fig 3. Key components of the Russian Balance of Payments in 1994-2011*

The sizable favorable current account was first formed in Russia after the major ruble devaluation in the aftermath of the 1998 crisis. At the same time the Central Bank of the Russian Federation started preventing any substantial ruble strengthening through accumulation of the international reserve assets. The growth of the international reserves of the Central Bank of the Russian Federation continued throughout the entire period of the 2008 energy prices increase. It is further noted that the net capital outflow from Russia gave way to the capital inflow in 2006–2007 following a significant inflow into Russia of investment and an increase in borrowings by the Russian companies abroad.

The 2008 crisis was followed by an oil prices increase. However, the exchange rate policy of the Central Bank of the Russian Federation shifted. Gradually, the Central Bank of the Russian Federation discontinued its money market interventions ensuring only smoothing of the volatility of the national currency exchange rate. As a result, the trade balance statistics show that the favorable current account increasingly corresponded with the unfavorable capital and financial accounts.

Thus, the dynamics of the indicators of the Russian balance of payments to a considerable degree depends on the world energy prices dynamics. The energy prices evolution directly affects the size of the Russian export. At the same time, the effect of the terms of trade on the real ruble exchange rate and the pace of economic development in Russia stimulates a corresponding imports growth. A favorable change in the terms of trade normally makes Russia more attractive for foreign investors. However, the dynamics of the capital and financial accounts depends, first and foremost on the results



of evaluation of global and country risks and the monetary policy of the Central Bank of the Russian Federation.

As we see from the table 20, Russia the pace of economic development in Russia stimulates a corresponding imports growth. A favorable change in the terms of trade capital outflow and accumulation of Central bank reserves played a more significant role in recycling than for the sample as a whole.

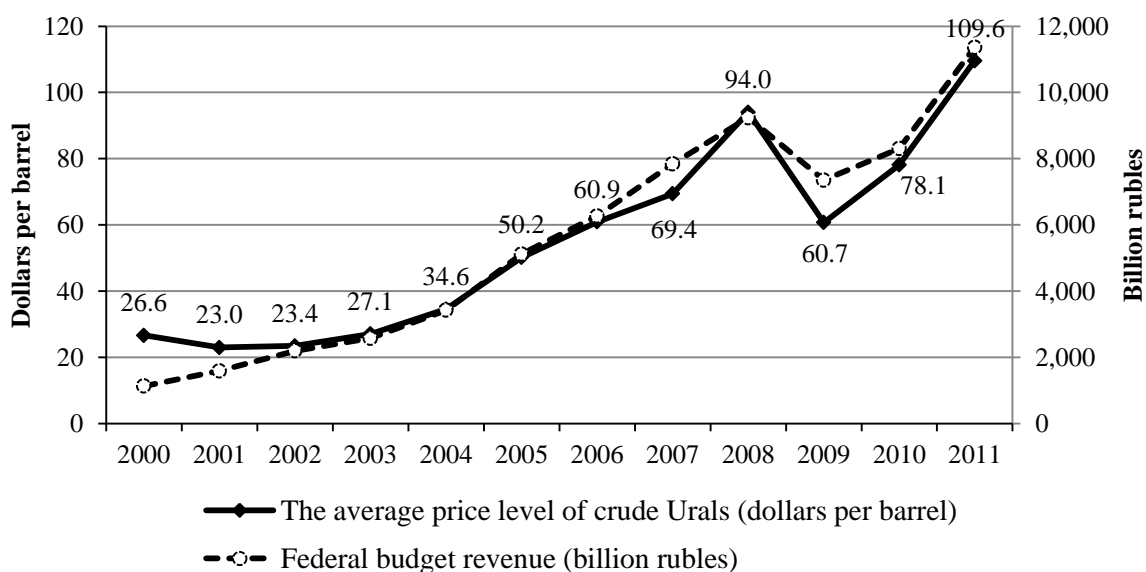
Table 20

<b>Cumulative allocation of petrodollars (2002-2011)</b>					
	<b>Oil export revenue</b>	<b>Imports of goods and services</b>	<b>Current account surplus</b>	<b>Central bank reserves</b>	<b>Gross capital outflow</b>
Russia \$US bln	2957.6	2467.6	704.8	462.0	778.5
Russia in % of total	24.4	25.1	21.4	30.3	31.3
Total (oil exporters) \$US bln	12103.6	9824.0	3286.4	1523.2	2487.5

Source: Shahrokh Fardoust. Managing oil prices and recycling petrodollars. Carnegie Endowment for International Peace. May 31, 2012.

### Oil and gas budget revenues and their use

Dependence of the Russian economy on oil and gas revenues is most evident through an analysis of the Russian budget revenues. The prices increase of the 2000s contributed to a greater dependence of public finances on market fluctuations and to a slow-down of the national economy modernization. Fig. 4 shows that throughout the 2000s a direct correlation was registered between the oil prices and the federal budget revenues.



Source: the Central Bank of the Russian Federation, Ministry of Finance of the Russian Federation.

Fig 4. The average annual price level of Urals crude (dollars per barrel) and the federal budget

revenues (billion rubles) in 2000–2011.

In accordance with the approach of the Ministry of Finance of the Russian Federation the federal budget revenues are divided into the oil and gas revenues and non-oil and gas revenues. Oil and gas revenues comprise revenues from the minerals (hydrocarbons) extraction tax, export duties on crude oil, natural gas, and refined oil products. Over the last few years the oil and gas revenues demonstrate a steady growth trend (from 7.6 % of the GDP in 2009 to 10.3 % of the GDP in 2011, see Table 21). At the same time, 2011 saw parity between the non-oil and gas revenues and oil and gas revenues (10.5 % of the GDP and 10.3 % of the GDP).

**Table 21. Russian federal budget revenues and expenditures in 2000–2011**  
(% of the GDP)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Expenditures (1)	14.2	14.8	18.9	17.8	15.8	16.3	15.9	18.1	18.2	24.7	22.4	20.0
Revenues (2)	15.5	17.8	20.3	19.5	20.1	23.7	23.3	23.6	22.3	18.8	18.4	20.8
Including non-oil and gas revenues (2.1)	11.7	13.1	15.1	14.1	13.5	13.6	12.7	14.6	11.8	11.2	9.9	10.5
Oil and gas revenues (2.2)	3.8	4.7	5.2	5.4	6.6	10.1	10.9	9.0	10.6	7.6	8.5	10.3
Russian federal budget surplus (3)=(2)–(1)	1.4	3	1.4	1.7	4.3	7.4	7.5	5.5	4.1	-5.9	-4.0	0.8
Non-oil and gas budget deficit (4)= (2.1)–(1)	-2.5	-1.7	-3.8	-3.7	-2.3	-2.7	-3.4	-3.5	-6.4	-13.5	-12.6	-9.6

Source: Ministry of Finance of the Russian Federation.

The existing correlation between the non-oil and gas revenues and the oil and gas revenues is negative for the Russian economy. The non-oil and gas revenues constitute a more stable type of revenues. To a large extent the 2009om the minerals (hydrocarbons)as brought about by the dwindling world price quotations. To mitigate the situation, as far back as 2003 the Government of the Russian Federation made a decision on establishing the Stabilization Fund intended to accumulate excess receipts from oil sales. At later stage it was divided into the Reserve Fund and the *National Welfare Fund*.

The impact produced by the non-oil and gas revenues on the Russian economy can be understood if one looks at the share of the non-oil and gas revenues and oil and gas revenues in the structure of the enlarged government budget (Table 22). Overall, the oil and gas revenues of the

federal budget in 2005t in 2005of the non-oil and gas revenues and oil and gas revenues in the ype of revenues.

**Table 22. Russian federal budget revenues and expenditures in 2000–2011 (% of the enlarged government budget revenues)**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Expenditures (1)	37.1	38.5	50.0	47.8	42.1	41.1	40.2	45.4	47.1	72.0	64.4	52.4
revenues (2)	40.5	46.3	53.7	52.4	53.6	59.7	58.9	59.2	57.7	54.8	52.8	54.5
Including non-oil and gas revenues: (2.1)	30.6	34.1	39.9	37.9	36.0	34.3	32.1	36.6	30.5	32.3	28.5	27.4
Oil and gas revenues (2.2)	9.9	12.2	13.8	14.5	17.6	25.4	27.6	22.6	27.4	22.1	24.4	27.1
Surplus (+) / deficit (-) of the Russian federal budget, % of GDP (3)=(2)–(1)	3.7	7.8	3.7	4.6	11.5	18.6	19.0	13.8	10.6	-17.2	-11.5	2.1
Non-oil and gas budget deficit (4)= (2.1)–(1)	-6.5	-4.4	-10.1	-9.9	-6.1	-6.8	-8.6	-8.8	-16.6	-39.3	-40.0	-25.4

Source: Federal Treasury, Rosstat, the Gaidar Institute estimates.

Establishing the first Russian sovereign fund Institute estimates.f the enlarged government budget revenues)05t in 2005of the non-oil and gas revenues and oil and gas revenues in the ype of revenues. To a a [balance of the budgetary account](#) with the Central Bank of the Russian Federation since 2000. In 2003, conscious of the time-sensitivity of the budget revenues against the background of the world market oil price increase and wishing to prevent a proportional growth of the budget expenditure obligations the Government of the Russian Federation proposed establishing a Stabilization Fund aimed to absorb excessive (against the theoretical value under a certain long-term oil price – the cut-off or the benchmark price) revenues from oil production and export.

The decision took a legal shape on 23 December, 2003 with the adoption of the Federal Law e-sensitivity of the budget revenues against the background tary Code of the Russian Federation with Regard to Establishing the Stabilization Fund of the Russian Federationtione Federal Law e-sensitivity of the budget revenues against the back<sup>st</sup> of January, 2004.

The Stabilization Fund of the Russian Federation was intended to ensure the state budget balance in cases where oil prices go down below the benchmark price line. According to the official

statement by the Ministry of Finance of the Russian Federation “The Fund contributes to stability of the country’s economic development, serves as an instrument of tying up redundant liquidity, eases inflationary pressure, reduces the national economy dependence on unfavorable fluctuations of revenues from commodities export”<sup>60</sup>. In this way, at its initial stage the Fund represented a classical example of a resource-based stabilization fund aimed to damp market-induced fluctuations of the Central Government budget revenues. The resources of the Fund could be used to close the federal budget deficit only when oil prices went below the benchmark price<sup>61</sup>. However, when the accumulated resources of the Fund exceeded 500 bln rubles the excess could be spent for other purposes.

In view of the fact that as soon as 2005 the resources of the Fund exceeded the above level (1387.8 bln rubles) their significant part (887.8 bln rubles) could be spent for other purposes. As a result, the main part of the resources (72.4% of the accumulated surplus) was channeled to pay the foreign debt of the Russian Federation (643.1 bln rubles) and 3.4 % (30 bln rubles) – to close the deficit of the Pension Fund of the Russian Federation (see Table 23).

**Table 23. Dynamics of the flow of financial resources of the Russian Stabilization Fund in 2004–2007, bln rubles**

Year	Revenues				Disbursement			End-of-year balance
	Total	Export duties	Minerals extraction tax (oil)	Crediting the federal budget balance	Repayment of the foreign debt	Funding development institutions	Closing the Russian Pension Fund deficit	
2004	522.3	240.8	175.5	106.0	–	–	–	522.3
2005	1387.8	663.4	507.3	217.1	643.1	–	30.0	1237.0
2006	1708.6	991.2	646.7	47.8	604.7	–	–	2346.9
2007	1895.9	918.9	674.7	156.7	33.7	300.0	–	3849.1
<b>Total</b>	<b>5514.6</b>	<b>2814.8</b>	<b>2004.1</b>	<b>527.6</b>	<b>1281.5</b>	<b>300.0</b>	<b>30.0</b>	

Source: Ministry of Finance of the Russian Federation.

<sup>60</sup><http://www.minfin.ru/ru/stabfund/about/> – The official site of the Ministry of Finance of the Russian Federation.

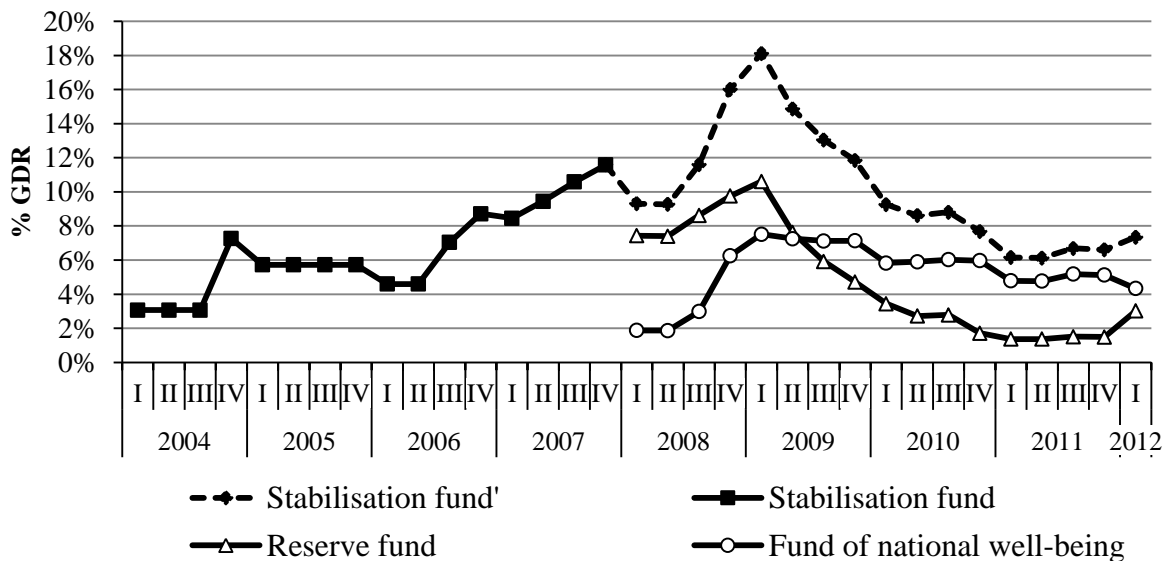
<sup>61</sup>As of 1<sup>st</sup> of January, 2004 the benchmark Urals crude blend was set at \$US20 per barrel and as of 1<sup>st</sup> of January, 2006 the cut-off price was increased to \$US27 per barrel. In spite of the continuing increase in the oil prices no further increase in the cut-off price was initiated because of the risk of boosting inflation and the budget dependence on the tone of international markets.

In 2005 repayment of the foreign debt of the Russian Federation was performed in the following manner:

- 93.5 bln rubles (equivalent to \$US 3.3 bln) – repayment of the debt to the International Monetary Fund;
- 430.1 bln rubles (equivalent to \$US 15 bln) – repayment of the debt to the Paris Club member countries;
- 123.8 bln rubles (equivalent to \$US4.3bln) – repayment of the debt to the Vnesheconombank for the credits extended to the Russian Ministry of Finance in 1998–1999 for repayment and servicing of the foreign national debt of the Russian Federation.

In 2006, 604.7es (equivalent to \$US4.3bln) – repayment of the debt to the Vnesheconombank for the credits extended to the Russian Ministry of Finance in 1998–1999 for repayment and servicing of the foreign national debt of the Russian Federation Investment Fund – 90 bln rubles).

By the moment of splitting of the Fund (1<sup>st</sup> of February, 2008) the total amount of resources stood at 3851.8 bln rubles (\$US157.38 bln) which was equivalent approximately to 9.3stry of Finance in 1998–1999 for r



Source: Ministry of Finance of the Russian Federation.

*Fig 5. The Stabilization Fund, the Reserve Fund, the National Welfare Fund in 2004-2011 and Q1 of 2012, % of GDP*

From 1<sup>st</sup> of January, 2008 the Stabilization Fund of the Russian Federation was split into two parts: the Reserve Fund (the initial size of parts: the Russian Federation National Welfare Fund (782.8 billion rubles) and the National Welfare Fund of the Russian Federation (782.8 billion rubles)).

The Reserve Fund, as the Stabilization Fund before it, forms part of the federal budget resources. It is intended to ensure performance by the Government of its expenditure obligations in

case of diminishing oil and gas revenues of the federal budget. The regulatory value of *the Reserve Fund* was established at the level equal to 10% of the GDP<sup>62</sup>. Unlike the case of the *Stabilization Fund of the Russian Federation* the sources of forming the *Reserve Fund* in addition to the federal budget oil production and exports revenues include revenues from the minerals (hydrocarbons) extraction tax (natural gas and gas condensate) and export duties on natural gas.

Over the period of financial and economic crisis the *Reserve Fund* as one of the sovereign funds of the Russian Federation established its right to exist. The accumulated financial resources played a major role in mitigation of the crisis. In 2008 and 2009, the Central Government had to spend 4010.1 bln rubles to that end. As a result, from the moment of establishing *the Reserve Fund* (1 January, 2008) till 1 June, 2012 its resources dwindled significantly. The maximum size was registered on 1 March, 2009 – 20734.9 bln rubles. As of 1<sup>st</sup> of June, 2012 the resources amounted to 1953.9 bln rubles. (see Fig. 5)

In accordance with the Federal Law dated 30 September, 2010 (see Fig. 5) The maximum size was registered on 1 March, 2009 – played a major role Federation and Certain Other Legislative Acts of the Russian Federation<sup>10</sup> (see <sup>st</sup> of January, 2010 to 1<sup>st</sup> of February, 2014 revenues from managing the *Reserve Fund* shall not be credited to the Fund but channeled to finance the federal budget expenditures. Besides, there shall be no separate accounting for the federal budget oil and gas revenues. At the same time, the procedure of payments and transfers associated with the formation and spending of the federal budget oil and gas revenues, the oil and gas transfer, the resources of the *Reserve Fund* and *the National Welfare Fund* was discontinued.

*The National Welfare Fund (NWF)* is the other sovereign fund established in the course of reforming the *Stabilization Fund*. It forms part of the federal budget resources subject to a separate accounting and management for the purpose of ensuring co-financing of the voluntary retirement savings of the Russian citizens and balancing (closing the deficit) the budget of the *Pension Fund* of the Russian Federation.

In view of its legal status that Fund is less exposed to fluctuations caused by external factors. As of 1<sup>st</sup> of June, 2012 the Fund resources amounted to 2773.8 bln rubles. Their maximum size was registered on 1<sup>st</sup> of March, 2009 as 2995.5 bln rubles and the minimum (within the period starting on 1<sup>st</sup> of January, 2009) 2995.5 bln rubles and the minimum (w

In fact, the *Reserve Fund* has become a functional successor to the *Stabilization Fund* as it forms part of the federal budget resources subject to separate accounting and managing for the purpose of performing the oil and gas transfer in case of insufficiency of the oil and gas revenues for financing the said transfer. The *Reserve Fund* is formed by the federal budget oil and gas revenues in an amount exceeding the size of the oil and gas transfer approved for the corresponding financial year provided that the accumulated resources of the Fund do not exceed its regulatory value; and by the revenues

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<sup>62</sup>From 1<sup>st</sup> of January, 2010 to 1<sup>st</sup> of January, 2014 no regulatory size of the *Reserve Fund* will be set and the oil and gas revenues of the federal budget will not be used to finance the oil and gas transfer and to form the *Reserve Fund* and the *National Welfare Fund*: instead they are channeled to support the federal budget expenditures.

from managing the Reserve Fund resources. In other words, it is a classical resource-based stabilization fund.

In its turn, the NWF by its type is close to sovereign or resource-based funds of future generations and is formed by the federal budget oil and gas revenues in the amount exceeding the oil and gas transfer approved for the relevant financial year provided that the accumulated resources of the Reserve Fund do not reach (exceed) its regulatory value; and by the revenues from managing the NWF resources.

### **Macroeconomic and fiscal effects of establishing sovereign funds: implications for economic policies**

Three aspects could be sorted out from the point of view of macroeconomic effects and implications of establishing sovereign funds in the Russian Federation.

1. Intertemporal federal budget stabilization.
2. Support of the anti-inflationary policy of the Central Bank of the Russian Federation and the policy of limited growth of the ruble exchange rate.
3. Funding the anti-crisis measures in 2008–2009.

**Fiscal policy.** As was said earlier, the key purpose of establishing the Stabilization Fund of the Russian Federation was to institutionalize accumulation of the federal budget surplus under the favorable market conditions at the expense of the federal budget oil and gas revenues. Part of the oil and gas revenues is channeled to finance the federal budget operational expenditures and part can be saved. Correspondingly, by the end of Q1 2012, the aggregate amount of the Russian sovereign funds accounted for almost 8% of the GDP (see Fig5).

In this way, in the period of favorable market situation the presence of the Stabilization Fund constituted a serious institutional constraint to the budgetary expenditures growth. At the same time even such a constraint was not all powerful and in 2007–2008 with the oil prices at their high there was a significant growth of the federal budget expenditures in real terms.

In their turn, in 2009-2010 the Reserve Fund resources became the primary source of financing the federal budget deficit accumulated as a result of contraction of the revenue part of the budget and the adoption of the anti-crisis measures package. However, the magnitude of the budgetary deficit in Russia (as, it must be said, is the case in many countries of the world) evidently goes beyond expectations. The size of the Stabilization Fund and later of the Reserve Fund was set proceeding from the necessity to finance the 3 % of the GDP deficit for maximum 3 coming years. However, in 2009 the Russian federal budget deficit rose to 5.9 % and in 2010 to 4.0 %. In 2009-2010 only, 4 trln rubles were required to finance the federal budget deficit. In spite of the fact that in 2011 the federal budget surplus amounted to 0.8 to 0.8e Reserve Fund resources became the primary source of financing the federal budget deficit accumulated as a result of the current downward price movement can bring about a budget deficit.

In view of the fact that in the foreseeable future the Russian Government intends to maintain the federal budget deficit (gradually reducing it to 0.1 current downward price movement can be annual oil price of \$US 104 per barrel), there is a risk of having the *National Welfare Fund* involved in financing the deficit.

**Monetary and exchange rate policies.** The availability of sovereign funds and their role as part of the international reserves of the Central Bank of Russia produced an important effect on the Russian monetary and exchange rate policies.

As of 1<sup>st</sup> of January, 2009 the total amount of money stock withdrawn from the economy and deposited into the funds Bank of Russia produced an important effect on the Russian monetary and exchange rate policies. [high-powered money](#)). To retain the money supply at that level in 2004-2008 would mean increasing the money supply growth rates approximately by 15 an important effect on the Russian monetary and exchange rate policies. ice of \$US 104 per barrel), there 11.35 % a year (which, by itself, is one of the highest world rates) to 13.5–14%, year-over-year.

At the same time, the entire amount of the funds 004-2008 would mean increasing the money supply growth rates approximately by 15 an important effect on the Rurst half of 2008. Naturally, such an inflow of currency into the country induced a response on the part of the Russian Ministry of Finance in the form of a demand on the domestic market which helped the Central Bank of the Russian Federation to keep the ruble exchange rate at a level not exceeding 23.5–24.0 rubles per dollar. Modeling of a situation where in 2006–2008 there would be no necessity to place the reserves of the funds in foreign exchange shows that in such a case the nominal ruble exchange rate could grow to 13–15 rubles per US dollar by August 2008. Correspondingly, by the start of the autumn 2008 crisis, the ruble real effective exchange rate relative to July 1998 would be not 116.5% (the maximum value for ruble's real exchange rate before the 1998 crisis) but 180–200% which would mean a full loss of competitiveness of the national producers and an abrupt slowdown of the economy growth even under high prices of oil and other Russian exports as early as 2007.

**Financing the anti-crisis measures in 2008 fund.** In 2008 the anti-crisis measures in 2008 funds 004-2008 would mean increasing the money supply growth rates approximately by 15 an important effect on the Rurst half of 2008. Naturally, such an riod of economic growth. The resources of the oil and gas funds were the main sources ensuring the federal budget balance in 2009. The idea of forming oil and gas funds lived up to expectations and shall give credit to the country's fiscal policy.

**Table 24. Dynamics of forming and using the oil and gas funds in 2009 (bln rubles)**

Indicator	End of 2008	Received in 2009	Used in 2009 for:	End of 2009
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	balance*	Oil and gas revenues	Revenues from resource managem ent	Ensuring the federal budget balance	Ensuring the oil and gas transfert	balance.*
Reserve Fund	4027.6 (9.8 % of GDP)	488.5	205.0	2964.8	179.4	1830.5 (4.7 % of GDP)
National Welfare Fund	2584.5 (6.3 % of GDP)	–	92.5	–	–	2769.0 (7.1 % of GDP)
Total	6612.1 (16.0 % of GDP)	488.5	297.5	2964.8	179.4	4599.5 (11.8 % of GDP)

\* The balance recomputed at the exchange rate of 1 January, 2009 and 1 January, 2010 году, correspondingly.

Source: Ministry of Finance of the Russian Federation, Federal Treasury.

Officially, the NWF resources were not used to finance the federal budget deficit and the anti-crisis measures. However, on 13 October, 2008 President of the Russian Federation signed a package of legislative acts (later adopted by the State Duma and endorsed by the Council) aimed to stabilize the country's financial system under the crisis conditions: in particular, they included amendments giving way to deposit the NWF resources with the Vnesheconombank till 31<sup>st</sup> of December, 2019 in the maximum total amount of 450 bln rubles at an annual interest rate of 7%.

In this way the changes touched only the admissible assets portfolio for placement of the NWF resources assures. However, on 13 October, 2008 President of the Russian Federation signed a package of legislative acts (later adopted by the State Duma and endorse anti-crisis measures. In particular, 404 bln rubles were provided to 14 Russian commercial banks as subordinated credits, and 30 bln rubles – to the «Russian Development Bank» for the purpose of crediting [small and middle-sized businesses](#).

Overall, looking at the Reserve Fund role as a source of financing the Russian federal budget deficit in 2009s. However, on 13 October, 2008 President of the Russian Federation signed a package of legislative acts Fund resources:

First, using the Reserve Fund resources for closing the budget deficit is, in fact, money emission by the Bank of Russia, as in practical terms the operation means migration of the Central Bank resources on the liability side from the special account of the Government of the Russian Federation to the money base (through the Government current account). The operation could have been of a non-emission nature in case the Bank of Russia simultaneously was selling foreign exchange

(which, nominally, is the Reserve Bank counterpart). However, after reaching the maximum low in January 2009, the international reserves of the Bank of Russia started a steady growth. Thus, from the point of view of the monetary policy the Fund is not a reserve but serves as a stand-alone channel for money inflow into the economy.

Second, the above described effect of money emission from the budget account is observed every time that the Government spends money within the framework of the Russian system of Treasury having budgetary accounts with the Bank of Russia, i.e. brought outside the money supply. Such fluctuations are observed throughout every year (for example, a sharp increase in money aggregates in December when the budget closes the outlay accounts or monthly money supply contractions on the last days of the month – at the time of tax payments), however, due to the established tax period – the budgetary year – consideration is given only to the resulting effect of the budget operations on money supply. If the period is extended to, say, five years then the use of the Reserve fund resources stops being emission in its pure form, as the money accumulated by the Fund can be considered, within such a period as temporarily withdrawn and re-injected into the economy.

Third, from the point of view of the fiscal and debt policies the Reserve Fund resources can be considered as the Russian Government reserve, as its availability makes it possible to finance the budget deficit without borrowings on the market and without increasing the sovereign debt. At the same time, experience of the EU and such countries as the USA, Japan, Great Britain, etc. it is the growth of the sovereign debt in the interest of financing the package of anti-crisis measures that becomes a key problem of the economic policy at the recovery stage. In this respect, the availability of the Reserve Fund can be viewed as a factor potentially permitting the country to avoid the debt burden growth and passing the current budget expenditures onto the new generation.

### **Impact on poverty alleviation, social policy and labor market**

From the point of view of social effect and supporting the social standard of living in Russia the sovereign funds have so far produced a limited and for the most part indirect impact and it is rather difficult to differentiate between the impacts produced by each of the funds.

We believe that the most important impact on the social standard of living was produced by the anti-inflation consequences of the establishment of the Stabilization Fund (see above). The cumulative growth of incomes of people in real terms due to the low inflation in 2004-2008ion consequences of the estab

One more important result of the presence of the Reserve Fund is financing of the federal budget deficit in 2009, first and foremost of its social items, which helped achieve, under the conditions of grave crisis (the real GDP decline in 2009 – 7.9 %), the real income of the population growth of 2.3 % thus reducing the negative effect of the domestic demand contraction and ensuring the personal savings growth. As mentioned above, these expenditures were financed without increasing the government borrowings and, consequently, without the debt burden growth for the future generations.

Presently, the National Welfare Fund plays a negligible role in resolving the social problems. Moreover, the NWF apparently is not successful in performing the role of a tool for resolving the deep-rooted problems of the Russian pension system.

### **The effect of the oil price increases on the economic growth in the Russian Federation**

The effect produced by the international market conditions on the economic growth in developing countries, in transition economies, is mixed and depends on the outlook, structure and specifics of the economy, and the development stage. High export prices while strengthening the real exchange rate of national currencies produce a negative effect on the rates of economic development. However, it was characteristic of Russia in 2000-2007 to have a positive effect of the favorable market conditions on the economic growth, first of all, due to the growing demand stimulating utilization of the available capacities and widening of the production capabilities through investment. The mechanism of such effect has been described in terms of the economic growth theory, production function and the IS-LM model.

When analyzing the effect of the dynamics of export prices for commodities and energy resources it is necessary to single out the positive effect of the positive international market trends as a result of the stimulative monetary and fiscal policies; investment growth due to the additional exports revenues (the «investment growth » mechanism), and the wealth effect. The negative effect of higher oil prices on the economic growth manifests itself in the «Dutch disease» and political and economic factors impeding the economic development.<sup>63</sup>

The suggested model of identification of the structural and cyclical components of the economic growth in Russia is based on the study of the long-term and short-term effects of the international market environment on the country's economic growth rates.

The long-term effect of the market trends on output (the real GDP) has at its basis the amount of investment that depends on the amount of resources injected into the economy under this or that tone of the world energy market. The oil prices level defines the oil exports value, the total imports, including imports of resources for investment, which predetermines accumulation of the physical capital, human capital and technologies in the economy and in this way the rates of the potential output (economic growth) in the long-term and short-term perspective. This implies that the investment growth mechanism presupposes that each price level corresponds to a certain rate of economic development: low prices go with low investment which determines the low rates of the GDP growth, high prices go with large investment and, consequently, high rates of the GDP growth. Thus,

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<sup>63</sup>The issue was examined in more detail by Kazakova M.V., Sinelnikov S.G., Kadochnikov P.A.(2009): Analysis of the Structural and Conjunctural Components of the Tax Burden in the Russian Economy. Proceedings of the Proceedings of the Institute for the Economy in Transition, №129P (the publication is available at [www.iep.ru](http://www.iep.ru)), and Kazakova M.V., Sinelnikov S.G: Conjecture of the World Energy Market and the Economic Growth Rates in Russia // Economic Policies, № 5, 2009.

the rates of the GDP growth are constant under the predetermined oil prices level.

In other words, the oil price level determines production growth, i.e. under a predetermined oil price level there exists a certain constant (stationary) rate of the GDP growth and, correspondingly, the world oil prices growth entails quicker GDP growth. It should be noted that the said correlation is the correlation between the GDP growth rates and the price level: higher levels of prices mean higher growth rates due to larger investment.

Oil price fluctuations do not necessarily suggest that GDP takes a new long-term growth trajectory defined by the investment dynamics. Temporary deviations of the actual rate of production gains from the stationary one are determined by the actual demand fluctuations related partially to the short-term evolution of the oil price. The rest of the demand fluctuations can be the effect of other factors, such as the public and investor sentiment, monetary and fiscal policies, etc. The said deviations represent the short-term effect of the energy prices market trends on the GDP growth rate.

In the short-term, a transition to another level (i.e. growth) of prices and a change in the net exports can (by affecting the aggregate demand) cause a deviation from the constant rate of economic growth (in other words, bring about an increment in the constant growth rate): either an increase in the constant GDP growth rate under growing oil prices or a decrease under declining oil prices. In this particular case we are referring to the effect of the prices level on the output level. The world oil prices growth is accompanied by the exports growth and, consequently, the aggregate demand is growing which means that, subject to the existence of available capacity and labor, the GDP is growing. In other words, a relationship between the GDP and oil prices is evident.

For the purpose of decomposition of the GDP expansion into structural and cyclical components we have estimated equation (1), describing a long-term relationship between the seasonally adjusted GDP expansion in real terms (I(1)), the oil price in real terms (deflator – the ruble real effective exchange rate, REER) (I(1)) and the growth of the autonomous investment into fixed capital (I(0)):

$$\Delta Y_t = \alpha_0 + \alpha_1 P\_oil_t + \alpha_2 \Delta Inv\_A_t + \eta_t, \quad (1)$$

where  $\Delta Inv\_A_t$  - autonomous investment growth at t moment,

$P\_oil_t$  - oil price level in real terms (in prices of Q1 1999, deflator – REER) at t moment.

In order to analyze the dependence of the economic growth rates on oil prices in short-term perspective and, correspondingly to extract the cyclical component of the GDP expansion determined by the short-term oil price fluctuations we have also estimated the dependence of the residuals (1), described above, on the oil prices in real terms:

$$\eta_t = \Delta Y_t - \alpha_0 - \alpha_1 P\_oil_t - \alpha_2 \Delta Inv\_A_t = \gamma_0 + \gamma_2 \Delta P\_oil_t + \mathcal{G}_t \quad (2)$$

The following technique of the real GDP expansion decomposition into the structural and cyclical components can be applied on the basis of the determined ratios in equation (1):

- *Structural GDP expansion* represents a theoretical value of the GDP expansion under the

[long-term average annual](#) oil price  $\overline{P\_oil_t}$ , and the actual growth of autonomous investment  $\Delta Inv\_A_t$  in equation (1):

$$\overline{\Delta Y_t} = -0.005 + 0.001\overline{P\_oil_t} + 0.07\Delta Inv\_A_t$$

- *Cyclical GDP expansion* ( $\Delta Y_t^{oil\_inv}$ ) is determined as a difference between the theoretical value of the GDP expansion under actual values of the variables in equation (1) ( $\Delta Y_t$ ) and the structural GDP expansion ( $\overline{\Delta Y_t}$ ); in other words, this is a component of the GDP expansion resulting from deviations of the actual oil price from its [long-term average annual](#) level:

$$\Delta Y_t^{oil\_inv} = \Delta Y_t - \overline{\Delta Y_t}, \quad \text{which is equivalent to } \Delta Y_t^{oil\_inv} = 0.001 * (P\_oil_t - \overline{P\_oil_t})$$

- *Cyclical GDP expansion determined by oil price fluctuations in short term* ( $\Delta Y_t^{oil\_SR}$ ), is extracted on the basis of equation estimate (2):

$$\Delta Y_t^{oil\_SR} = \gamma_2 * (\Delta P\_oil_t - \overline{\Delta P\_oil_t}), \quad \text{where } \gamma_2 \text{ - estimated coefficient from equation (2).}$$

However, as was shown, the equation describing the logic of the oil price effect on the GDP growth rates in short term is insignificant in the time period under review and the results of such decomposition cannot be used in the final decomposition.

- *The contribution of autonomous investment and other factors not taken into consideration in the model* ( $\Delta Y_t^{other}$ ) is determined as a difference between the actual and the theoretical GDP expansion in real terms produced by the substitution of actual values of the explanatory variables into the determined co-integration ratio, i.e.:

$$\Delta Y_t^{other} = \Delta Y_t - \overline{\Delta Y_t}$$

It should be noted that interpretation of the produced values of the ratios of the equation (1) is applicable only to the real GDP measured in terms of expansion. Consequently, for the purpose of decomposition of the GDP growth rates into the structural and cyclical components we undertook a transition from the GDP expansion to the GDP growth rates through arithmetic conversion. Besides, as demonstrated above the extraction of the structural and the cyclical components of the economic growth rates in 2008-2009 is based on the estimates of the co-integration equation for the data sample not covering the crisis period from 2008 till now in view of the cyclical fluctuations of the Russian economy. The main results of such decomposition based on the logic of the co-integration describing relationship between the rates of economic development and oil prices in the long term are presented in Table 25.

**Table 25. Results of decomposition of the GDP growth rates in real terms, 1999–2009 (%)**

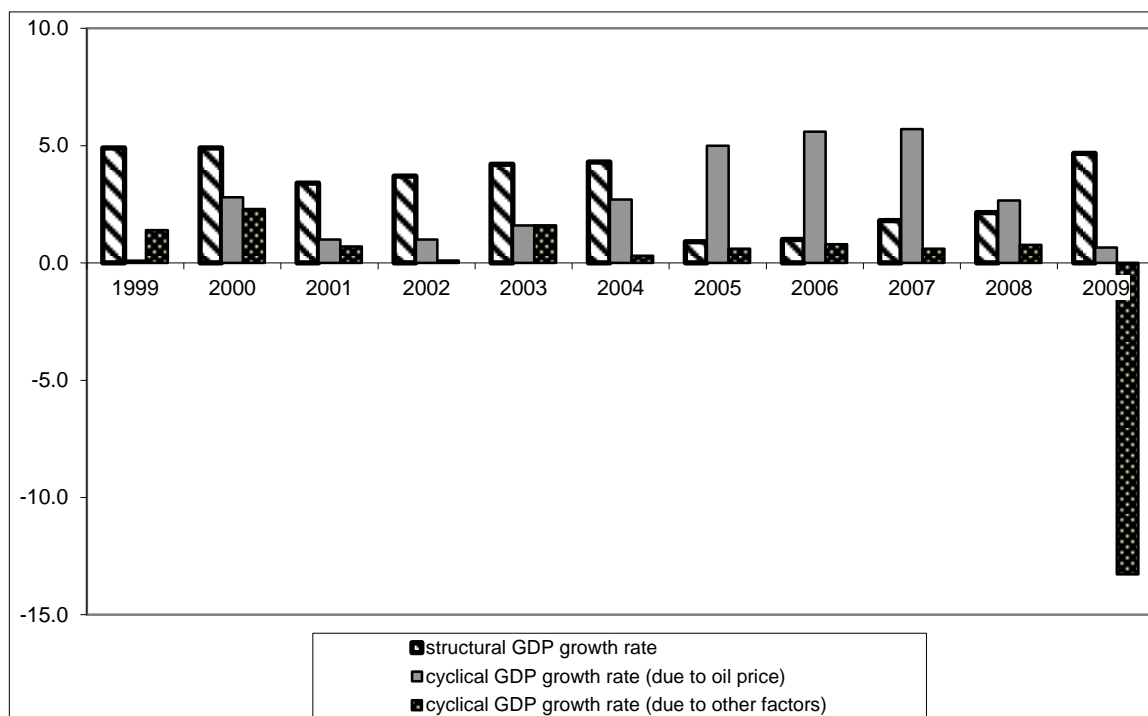
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	General (actual) GDP growth rate	Structural GDP growth rate	Cyclical GDP growth rate depending on oil price changes	Cyclical GDP growth rate depending on other factors	For reference	
					Brent crude price in real terms \$US/barrel in the 1999 prices	Nominal Brent crude price (\$US/barrel)
1999	6.4	4.9	0.1	1.4	17.7	18.0
	<i>100.0%</i>	<i>76.1%</i>	<i>1.5%</i>	<i>22.4%</i>		
2000	10.0	4.9	2.8	2.3	25.6	28.2
	<i>100.0%</i>	<i>49.2%</i>	<i>28.2%</i>	<i>22.6%</i>		
2001	5.1	3.5	1.0	0.7	18.4	24.3
	<i>100.0%</i>	<i>67.6%</i>	<i>19.2%</i>	<i>13.1%</i>		
2002	4.7	3.7	1.0	0.1	18.3	25.0
	<i>100.0%</i>	<i>78.2%</i>	<i>20.4%</i>	<i>1.5%</i>		
2003	7.3	4.2	1.6	1.6	20.6	28.9
	<i>100.0%</i>	<i>57.4%</i>	<i>21.3%</i>	<i>21.3%</i>		
2004	7.2	4.3	2.7	0.23	25.0	37.8
	<i>100.0%</i>	<i>59.4%</i>	<i>36.8%</i>	<i>3.7%</i>		
2005	6.4	0.9	5.0	0.6	32.4	53.4
	<i>100.0%</i>	<i>13.4%</i>	<i>77.6%</i>	<i>9.0%</i>		
2006	7.4	1.0	5.6	0.8	35.6	64.3
	<i>100.0%</i>	<i>13.5%</i>	<i>75.2%</i>	<i>11.3%</i>		
2007	8.1	1.8	5.7	0.6	37.3	71.1
	<i>100.0%</i>	<i>22.4%</i>	<i>69.9%</i>	<i>7.7%</i>		
2008	5.6	2.2	2.7	0.8	47.7	97.0
	<i>100.0%</i>	<i>38.5%</i>	<i>47.8%</i>	<i>13.7%</i>		
2009	-7.9	4.7	0.7	-13.3	32.5	61.8
	<i>100.0%</i>	<i>-59.5%</i>	<i>-8.9%</i>	<i>168.4%</i>		

Note. The second line for each year shows in italics shares of the corresponding components of the GDP growth rate in the total actual GDP growth rate in real terms (%). No shares of each component were determined for the negative GDP growth rate in 2009.

Source: authors' estimates based on Rosstat and IMF data.

Fig. 6 shows the dynamics of the structural and cyclical components of the GDP growth rates in 1999–2009.



Source: authors' estimates based on Rosstat data.

Fig.6: Structural and cyclical components of the GDP growth rates in 1999–2009 (%).

In 1999 cyclical components of the GDP growth rates in 1999–2009. Fig. 6 the share of the structural component of the GDP growth was rather high. In 1999 growth rates in 1999–2009. growth rate in the total actual GDP growth rate in real terms (%). No shares of each component with<sup>64</sup>, the concept of restorative growth developed in the 20s of the XX century suggests that the restorative growth is based on the earlier built production capacities and labor trained before the growth started.

Nevertheless, a characteristic feature (distinguishing it from the traditional concept of restorative growth) of the Russian economy became the investment demand increase at the end of the restorative growth period in 2001–2002. Over 2000–2004, there was a trend where investments into fixed capital demonstrated an outstripping growth rate against the GDP dynamics and production output in the key industries. A considerable effect on the nature of investment activities was produced by the intensive growth of the economic earnings. That related, on the one hand, to the favorable changes in the world hydrocarbons and metals prices, and, on the other hand, to the import substitution processes aimed to fill in the domestic market niches with domestic goods.

Thus, because of the investment demand growth in 2001 increase at the end of the restorative growth period in 2001–2002. Over 2000–2004, there was a growth becomes less important which in all probability explains a slight contraction of the structural component of the Russian GDP growth rates in 2001 that remained relatively stable till 2004 (see Fig. 6). At the same time, the positive value of the cyclical component of the real GDP growth rates determined by the oil prices in 1999 the same time, the positive value of the cyclical component of the real GDP growth rates determined by in 2000 to

<sup>64</sup>Gaidar E.T. Long Time. Russia in the World: Essays of Economic History (2005), M.: Delo.

\$US18.4 per barrel in 2001 results from the fact that over the entire period under review: from 1999 to 2009 the actual oil price in real terms was at a higher level than its [long-term average annual](#) value in contrast to 1995n.ru/c/m.exe?t=[long-term average annual](#) price was higher than the actual price.

Data from Table 25 show that starting from 2005 the role of the cyclical factors of economic growth acquired a greater strength. First of all this refers to higher world energy prices. Thus, in 2005 the share of the cyclical component of the GDP growth rates increased to 5.0% or 77.6% of the actual GDP expansion (i.e. increased two times against 2004) while the structural component of the GDP growth rates decreased.

Overall, as Table 25 shows the period from 2005 to 2007 is characterized by high GDP growth rates. This fact demonstrates the mechanism of the world oil prices effect on the economic growth rates in the long-term perspective: higher oil prices suggest higher export earnings and correspondingly higher imports, including investment resources, which results in higher rates of economic development both in the short-term and long-term perspectives.

The simultaneous expansion of the domestic and international markets served as a factor of a sustainable economic development in Russia in 2005owth rates in the long-term perspective: higher oil prices suggest higher export earnings and core situation on the world energy and primary resources markets the expansion of the domestic market was determined by the cumulative influence of the factors of an increase in business activities and the effective consumer demand. The increase in business activities was based on the outrunning growth of investment against the dynamics of final consumption and produced a significant effect on the character of the produced and used GDP. Thereby, an insignificant contraction in 2007 of the cyclical share of the GDP growth rates determined by the oil prices can be explained by a gradual diminishing of the oil prices role in the Russian economic growth and strengthening of the role of the internal demand factors<sup>65</sup>.

The market transformations in Russia could not but strengthen its ties with the world making it an integral part of the world economy. In one or another way the world economy shocks affected Russian output in the Soviet times. Nowadays their effect inevitable becomes more pronounced. 2008 became the first year when Russia began to feel in full the world crisis effects. At the beginning of 2008 the trend of an accelerated economic growth (reaching its peak in 2007) persisted. After that a [slowdown in the rates of economic growth](#) started leading to a steep decline of a wide range of key macro-indicators.

Almost all the negative trends persisted in 2009 although expectations concerning the crisis consequences (the financial collapse, the fall of the oil price below the \$US30 per barrel level, the uncontrollable devaluation of the Russian ruble, a deep decline in manufacturing output, mass unemployment and social instability) were not met, moreover, in 2009 certain positive trends of the Russian economy development emerged, including a considerable decline in inflation.

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<sup>65</sup>Note that as shown in Table 11 in 2005–2006 over 75% of the total actual GDP growth was ensured by the world oil prices. The result can be explained by the fact that since this paper does not make an assessment of the general model of economic growth in Russia, the oil price variable reflects the effect of all the other factors not accounted for in our specification in an explicit form.



As Table 25 shows, in 2008 an increase of the structural component of the Russian economic growth rates to 2.2 pp. (against 1.8 pp. in 2007) was observed. At the same time the cyclical component of the growth rates was noticeably contracting (from 5.7 pp. in 2007 to 2.7 pp. in 2008) although being slightly larger than the structural component which is likely to be explained by the remaining high average annual oil price level that however did not brought about high GDP growth rates in view of the negative effect of the crisis processes in the Russian economy described above.

Table 25 shows that in 2009 the increase in the structural component of the growth that happens under a [long-term average annual](#) oil price continued. Attention is drawn to a significant negative value of the component of the Russian GDP growth rates determined by other factors. We believe the result is logical in view of the negative expectations of the investors (foreign investors first of all) and the general public with regard to the crisis consequences for the Russian economy and the implementation of the Government anti-crisis measures. Not all of the measures were undertaken promptly and moreover some of them posed implicit threats to the economic agents' motivations to carry out a responsible policy and a real risk assessment.

The above results prove that the Russian economy to a high degree depends on the world markets tone as is evidenced by the high share of the cyclical component of the Russian economic growth in the period of rising oil prices and by the low share investors period of declining economic activities and falling oil prices. This relationship, as mentioned above poses a serious threat to the economic development and requires government policy measures aimed to increasing stability of the Russian economic growth.

### **Analysis of the oil price change impact on economic freedom, governance quality and competitiveness factors in oil exporting countries**

A study of the effect of export-commodity prices on the institutional characteristics of countries factors in oil exportortant and topical undertaking as it allows making an assessment of the degree of accountability for the political and economic reforms of the ruling party. In other words, it is important to differentiate between the objective and subjective factors of the country's institutional environment.

For the purpose of identification of the objective factors it would be useful to make comparison to other countries having similar characteristics. When verifying the hypothesis of a relationship between quality of a country's institutions and the state of primary commodity markets it would be appropriate to pay attention to a group of countries whose economies are extremely dependent on primary resources production and exports.

Such a study of relationship between the macroeconomic parameters of development of groups of countries exporting primary resources and the world market prices for such resources have

been carried out by the IMF specialists<sup>66</sup>. However, the study did not touch upon the institutional aspects of development the economies and societies of those groups of countries. This paper undertakes make an assessment of the relationship between changes in oil prices and changes in the international indexes characterizing development of various institutions in a group of oil exporting countries.

Values of the indexes of economic freedom, regulatory efficiency and global competitiveness were taken as characteristics of the institutional environment. The maximum lengths of the data series is characteristic of the economic freedom index covering the period of 1995-2012. For this reason the focus of this paper is on an analysis of the relationship between oil price and the values of this indicator.

The conclusions drawn on the basis of the study under review helps us better understand the objective factors affecting efficiency of the economic and institutional reforms in Russia.

### **Characteristics of the relationship between the economic freedom index and the oil price in the group of oil exporting countries**

The index of economic freedom is published by The Heritage Foundation since 1995. In 2012 it covered a group of 183 countries. The index comprises 10 indicators characterizing availability of various economic and institutional freedoms. Thus, for most of the countries the index series includes 18 point corresponding to the annual data.

Consider in more detail the coefficient of correlation<sup>67</sup> between the index of economic freedom and the oil price for the group of oil exporting countries (see Table 26). For this purpose we have to define average values for the index of economic freedom and for the sub-indexes for the group of exporting countries for each year of the 1995-2012 period.

**Table 26. Correlation between components of the economic freedom index and the nominal average Brent crude price in 1995-2012 across the energy exporting countries**

№	Indicator	Coefficient of correlation with oil price	t-statistics (16 points)	P-value
1	<b>Economic freedom index</b>	0.76	4.65	0.0003
2	Freedom of business sub-index	-0.61	-3.09	0.007
3	Freedom of trade sub-index	0.84	6.26	0.0000

<sup>66</sup> Commodity Price Swings and Commodity Exporters // IMF World Economic Outlook. April 2012, pp. 125-169.

<sup>67</sup> Coefficient of correlation is a major characteristic of the presence of a statistical relationship between the two variables and it estimates synchronization of the fluctuations of the parameters under review.

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4	Fiscal freedom sub-index	0.86	6.73	0.0000
5	Government spending sub-index	0.50	2.32	0.0341
6	Monetary freedom sub-index	0.61	3.06	0.0075
7	Investment freedom sub-index	-0.65	-3.45	0.0033
8	Financial freedom sub-index	0.23	0.96	0.3521
9	Property rights sub-index	-0.84	-6.10	0.0000
10	Freedom from corruption sub-index	-0.41	-1.78	0.0936
11	Labor freedom sub-index	0.13*	0.32	0.7581

Source: authors' estimates based on data from «2012 Index of Economic Freedom» (<http://www.heritage.org/>) and World Bank Indicators (crude oil, Brent, nominal \$/bbl).

\* estimates on the basis of data for the 2005 – 2012 period.

As Table 12 shows, in 1995-2012, overall, there was a not uniquely defined relationship between the dynamics of the index of economic freedom and the commodities market tone in the group of energy exporting countries (see Annex 1). This is related to the fact that the statistical relationship between the dynamics of certain components of the indicator (sub-indexes) and changes in the Brent crude prices on the world markets are oppositely directed.

In 1995-2012, there was a positive correlation between the dynamics of oil prices and the sub-index of fiscal freedom ( $r = 0.86$ ). Also, there was a positive relationship between the sub-index of government spending and the oil price ( $r = 0.50$ ). The sub-index of monetary freedom was positively related to the oil price ( $r = 0.61$ ).

At the same time, the sub-index of business freedom, on average, for the group of oil exporting countries negatively depended on its oil ( $r = -0.61$ ). The sub-index of investment freedom also was characterized by a similar negative correlation with the world markets oil price ( $r = -0.65$ ). The sub-index of property rights demonstrated a still more negative relationship with the oil price ( $r = -0.84$ ). The index of freedom from corruption, on average for the group of countries under review had an inverse dynamics with respect to the oil price changes ( $-0.41$ ), however, that effect to a large degree depended on the specific features of each individual country.

No stable relationship has been identified between the changes in the indexes of financial and labor freedoms on the one hand and the world oil price dynamics on the other. It may be suggested that the index of financial freedom is simultaneously under the positive and negative impacts of the changing oil price which explains why the final result is close to neutral. As to the index of labor freedom it can be noted that its calculation as part of the index of economic freedom started only in 2005 and the data available to date are not sufficient to detect stable relationships.

Annex two demonstrates clearly the dynamics of the index of economic freedom and the sub-

indexes it comprises in comparison to the world oil price changes. The graphs within the Annex show not only data points but also approximations of linear relationships between the indexes and the oil price values and the confidence level for such relationships (determination coefficient  $R^2$ ).

The greatest forecasting power is held by equations with maximum values of the coefficient of determination, i.e. dependence on the oil prices of the sub-indexes of freedom of trade (R show not only data points but also d property rights ( $R^2=0,70$ ). This implies that changes in the world oil prices account for over 70% changes in the average sub-indexes data in the group of oil exporting countries.

Throughout 1995-2012, there were periods of both an increase and decrease of the world oil prices. The oil price increases fell within 1995-1996, 1999-2000, 2002-2008, 2010-2011. The oil price decreases were registered in 1997-1998, 2008 and are predicted for 2012.

Thus, an average duration of the period of the oil price increase is 6.5 years and over those periods the oil price increased, on average, by about 6%. At the same time, an average duration of the period of the oil price decrease was 1 year and 3 months and the price fall, on average, was 15% of its value for the period as a whole.

On average, within the above periods of the downward trends on the world commodities markets the oil price fell 15% against the value for the period as a whole (see Annex3). In response to the changes in the oil prices the index of financial freedom demonstrated a controversial dynamics which was related to the multidirectional influence of the state-of-the-market factors on the indexes it incorporates.

The sub-index of business freedom was 0.5% lower in the periods of the oil price increase and 1.3% higher for the periods of its decrease. Which shows that this index is more sensitive to the oil price decrease than to its increase. Overall, the sub-index of freedom of trade deviated from its average value with the oil price changes (the sub-index of freedom of trade was 0.2% higher in the periods of the oil price increase and 0.6% higher in the periods of its decrease). The sub-index of fiscal freedom was more sensitive to the oil price decrease (in such periods it was, on average, almost 3% lower than for the period as a whole, while a price increase resulted in its growth by 1.1% only.

The sub-index of government spending was also more sensitive to the periods of the oil price decrease where it was lower, on average, almost by 5% against the average value for the period as a whole. In the periods of the upward market trends the sub-index of government spending was higher, on average, by about 2%. The sub-index of monetary freedom felt the most powerful negative influence on the part of the downward market shocks – in such periods it was, on average, almost 6% lower, than for the period as a whole. At the same time, in the periods of the oil price increase it was, on average, 2.2% higher against its average value in 1995-2012.

The sub-index of investment freedom was characterized by a mixed reaction to the changes in the market factors. As was shown above, the coefficient of correlation between this sub-index and the oil price demonstrates the presence of a negative relationship between them. However, a careful study of average deviations of the value of this sub-index over the various market periods casts some doubt on the conclusion. At the time of the oil price increase its value was, on average, almost 1% higher,

than for the period as a whole. With the oil price decrease the sub-index of investment freedom, deviated on average, by 2.5% to the lower side from its value for the entire period. The sub-index of financial freedom also, on average, demonstrated a direct dependence on the market tone. Its value was, on average, almost 1% higher in the periods of the oil price increase and almost 2% in the periods of its decrease against the value for the period as a whole.

The sub-index of property rights demonstrated an inverse dependence on the economic fluctuations. In the periods of the oil price increase it was going down, on average, by 1.4% and in the periods of the oil price decrease the sub-index was almost 4% higher against its value for the period as a whole.

The sub-index of freedom from corruption was also characterized by an inverse dependence on the oil price although not showing a high sensitivity to the changes in the market factors. In the periods of the oil price increase it was, on average, 0.3% lower and in the periods of oil price decrease index of freedom from corruption was also characterized by an

The sub-index of freedom of labor out of all the indicators under review turned out to be the most insensitive to the changes in the state of the market both from the point of view of average deviations in the periods of different market tone and from the point of view of the coefficient of correlation. This can be related to a rather short period of its calculation (the sub-index came into use in 2005) which does not make it possible to determine precisely the relationship between its changes and the oil price dynamics.

It should be noted that in the periods of the oil price decrease the values of the indicators were undergoing a greater change than in the periods of its increase. This is related to the fact that an average decrease of the oil price was much more significant (-15% of the average for the period) than its average increase (about 6% of the average for the period).

The coefficient of arc elasticity can be viewed as a more precise characteristic of sensitivity of the index of economic freedom and its components to the oil price changes<sup>68</sup>. As extreme point of the interval corresponding to the minimum and maximum oil prices we can take 1998 (\$US13 per barrel) and 2011 (\$US111 per barrel). The table of sensitivity coefficients of the sub-indexes of economic freedom to the oil price changes produced using the arc elasticity formula is presented below.

**Table 27. Sensitivity of the economic freedom indexes to the oil price changes**

№	Indexes	Change (%) of the index in response to the oil price increase by 1%
1	<b>Index of economic freedom</b>	0.05%

<sup>68</sup>Coefficient of arc elasticity  $x$  estimated from  $y$  is defined according to the formula  $E_{xy} = \frac{(x_2 - x_1) / x_{cp}}{(y_2 - y_1) / y_{cp}}$ , where

$(x_1, y_1)$  and  $(x_2, y_2)$  - extreme points of the interval. The minimum and maximum oil prices and the corresponding values of the indexes are taken as the extreme points.

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2	Sub-index of freedom of business	-0.04%
3	Sub-index of freedom of trade	0.14%
4	Sub-index of fiscal freedom	0.13%
5	Sub-index of government spending	0.02%
6	Sub-index of monetary freedom	0.18%
7	Sub-index of investment freedom	-0.07%
8	Sub-index of financial freedom	0.03%
9	Sub-index of property rights	-0.20%
10	Sub-index of freedom from corruption	0.01%
11	Sub-index of labor freedom	-0.04%

Source: authors' estimates based on the data from «2012 Index of Economic Freedom» (<http://www.heritage.org/>) and World Bank Indicators (crude oil, Brent, nominal \$/bbl).

\* - Data for the 2005 – 2012 period were taken as a basis for the calculations.

As Table 27 shows, reaction of the components of the index of economic freedom to the oil price changes is mixed. The highest negative sensitivity to the oil price fluctuations was demonstrated by the sub-index of property rights – with the oil price increase by 1%, the value of the sub-index dropped by 0.2%. The highest positive sensitivity to the changes of the state of the market was demonstrated by the sub-index of monetary freedom – the oil price increase by 1% entailed its increase by 0.18%.

Also a high sensitivity to the oil price fluctuations was demonstrated by the sub-indexes of fiscal freedom and trade freedom – the oil price increase by 1% entailed an increase in their values by 0.13%-0.14%.

However, it should be noted that in general such reactions are not elastic as they are not exceeding 1. This can be a result of the deferred cumulative effect of the oil price change on the institutional parameters which makes itself felt not only in the current period but also in the string of subsequent periods as well.

### **Characteristic of the relationship between the governance quality and the oil price in the group of oil exporting countries**

The World Bank started calculations of the indicators of governance quality for over 200 countries in 1996. However, until 2002 assessments of governance quality were carried out once in 2 years and the latest assessments are dated 2010. Thus, the available data reflect observations made over 12 years – 1996, 1998, 2000, 2002-2010. Table 28 shows coefficients of correlation between the indicators of governance quality and the oil price for a group of oil exporting countries.

Average values for a group of oil exporting countries were used as values of the indicators of governance quality (the list of the countries presented in Annex 1).

**Table 28. Correlation between the indicators of governance quality and the nominal price of Brent crude, on average, for a group of oil exporting countries**

№	Index	Coefficient of correlation with the oil price	t-statistics (8-10 points)	P-value
1	Voice and government accountability	-0.79	-4.21	0.0018
2	Political Stability and Absence of Violence	0.64	2.62	0.0257
3	Government effectiveness	0.29	0.94	0.3673
4	Regulatory quality	0.72	3.25	0.0087
5	Rule of law	-0.28	-0.93	0.3756
6	Control of corruption	-0.28	-0.94	0.3718

Source: authors' estimates based on the data from World Bank Worldwide Governance Indicators ([www.govindicators.org](http://www.govindicators.org)).

The highest coefficients of correlation were typical for the sub-indexes of voice and government accountability ( $r = -0,79$ ), regulatory quality ( $r = 0,72$ ), and political stability and absence of violence ( $r = 0,64$ ). A correlation analysis revealed a negative statistical relationship between the oil price and the level of voice and government accountability. At the same time, a positive statistical relationship is observed between the oil price and the level of political stability and regulatory quality.

The correlation analysis failed to identify a statistically important relationship between the oil price and such indicators as government effectiveness, rule of law and control of corruption. Which means there is a range of other factors defining values of such indicators in each country and producing a more pronounced effect on them than the oil price. Nevertheless the analysis demonstrated that between the last two elements and the oil price there is a trend towards a negative statistical relationship.

The limited and discrete data do not permit an analysis of the percentage change in the indicators of governance quality in the periods of the oil price increases and decreases. However, there is a chance to evaluate the degree of their sensitivity to the changes on the world commodities markets. To achieve we calculate the coefficients of arc elasticity for the indicators of governance quality by the oil price (see Table 29). In doing so we take into consideration only the indicators having a statistically significant coefficient of correlation with the oil price. This is necessary to ensure that the calculated sensitivity values were determined by the oil price changes and not by some other factors.

**Table 29. Sensitivity of indexes of governance quality to the oil price changes**

№	Index	Change (%) of the index in response to the oil price increase by 1%
1	Voice and Accountability	-0.03%
2	Political Stability and Absence of Violence	0.07%
3	Regulatory Quality	0.12%

Source: authors' estimates based on the data from World Bank Worldwide Governance Indicators ([www.govindicators.org](http://www.govindicators.org)).

Calculations of the coefficients of elasticity demonstrated that on average in the period under review the oil price increase by 1% in the group of oil exporting countries was accompanied by a 0.03% decrease in voice and government accountability, a 0.07% increase in political stability, while the most pronounced increase of 0.12% was registered in regulatory quality. When making an evaluation of the total effect of the oil price change on governance quality one shall take into account that in 1998-2008 the oil price on the world markets increased practically by 670%.

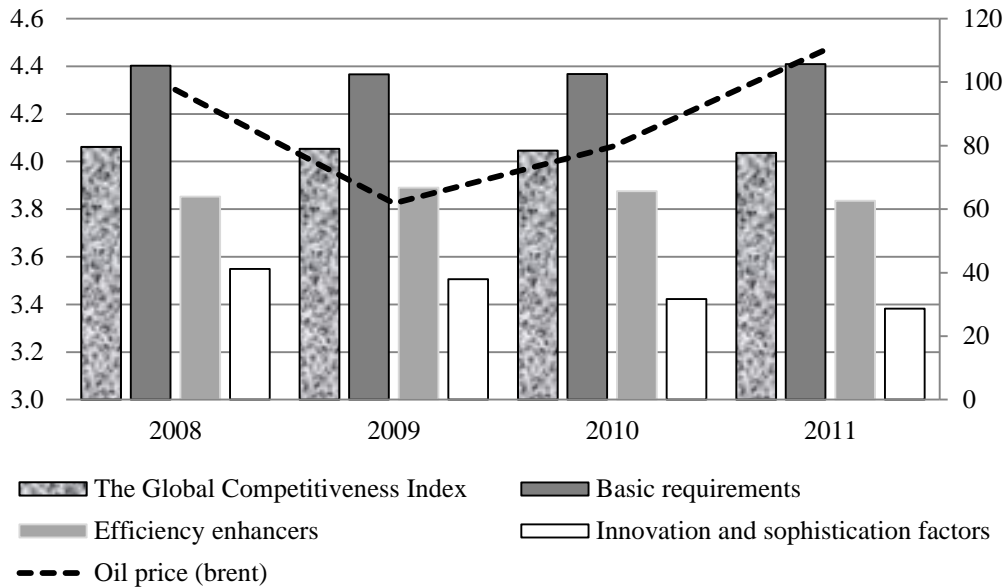
The study of the changes in the indicators of governance quality demonstrated that the oil price increase leads to a decrease in voice and government accountability. While receiving ever increasing oil exports revenues (resulting from nothing else but the favorable world market situation) the government has an opportunity to carry out a policy that does not depend on the taxpayer sentiments and wishes. The increase of the governance quality and political stability with the oil price increase can be explained by the emerging opportunities for the government to resolve conflicts through allocating more funds for the corresponding problem areas.

### **Characteristic of the relationship between the factors of global competitiveness and the oil prices in the oil exporting countries**

Calculations of the global competitiveness index for a large group of oil exporting countries started in 2004 under the methodology developed by Xavier Sala-i-Martin and Elsa V. Artadi. However, available and comparable are only the data for 2008-2011. A four year period is apparently not sufficient for carrying out a correlation analysis. That is why in this case we have made an attempt to perform a [graphical analysis](#) for the whole group of oil-exporting countries.

An analysis of the index under review will help better understand the structure of the factors of competitiveness for oil exporting countries. Three key factors can be identified within the framework of the global competitiveness index: infrastructure, efficiency enhancers, innovations and sophistication. As Graph 7 shows, it is typical for the oil exporting countries in general that the basic requirements prevail, including the macroeconomic situation in the country, prevail.





Source: developed by the authors on the basis of the data from: The Global Competitiveness Report (2011-2012, 2010-2011, 2009-2010, 2008-2009), pp. 16-17.

*Graph 7. Factors of competitiveness of oil exporting countries*

Factors of growth of competitiveness were significantly falling behind them by the level of their influence on competitiveness of the oil exporting countries. The role of those factors was diminishing in the periods of the oil price increase and going up in the periods of the oil price decrease. In 2009-2010, when the oil price fell, an average sub-index of the factors of growth of competitiveness for the group under review increased to 3.88-3.89. At the time of high world oil prices average values of this sub-index were lower coming to 3.84-3.85 in 2008 and 2011.

The weakest positions for the group of the countries were registered for the innovation and sophistication factors. In the period of the oil price growth in 2010-2011 an average value of the sub-index declined to 3.38 in 2011 against 3.51 in 2009 when the oil price was about 40% lower.

Thus, a high oil price makes it possible for the oil exporting countries to keep the basic competitiveness factors at an acceptable level while producing a negative effect on their positions with relation to the sub-indexes of efficiency enhancing and innovation.

**Characteristic of Russia’s development and its dependence on the oil price**

Let us consider the changes in Russia and its dependence on the oil price to keep the basic depending on the evolution of the world markets. Preliminary, it shall be noted that in accordance with the IMF in 2011 Russia ranked well while producing a negative by the share of the oil exports revenue in the total exports (about 29%). Annex 4 contains diagrams characterizing the changes in the index of economic freedom in Russia and in the sub-indexes it comprises depending on the oil price on the world markets. The [linear approximation](#) of the hypothetical dependence demonstrated in each

of the graphs makes it possible to determine the vector of the influence of the oil price change on the economic and institutional parameters of the country's development.

In Russia the most significant positive dependence on the oil price change was characteristic of the sub-indexes of freedom of trade (R1 price change on the economic and institutional parameters of the countative relationship was registered between the oil price and the sub-indexes of investment freedom ( $R^2 = 0.75$ ) and property right ( $R^2 = 0,61$ ).

Table 16 shows the coefficients of correlation between the indicators of government quality in Russia and the oil price. Let us compare the results produced with the average values for the group of oil-exporting countries. In Russia, as in this group of countries taken as a whole, no statistically significant correlation was observed between the oil price and such parameters of functioning of government authorities as rule of law and control of corruption (the coefficient of correlation for the last indicator, unlike the group-average value, had a negative sign).

**Table 30. Correlation between the indicators of government quality in Russia and the nominal price of Brent crude**

№	Indicator	Coefficient of correlation with the oil price	t-statistics (8-10 points)	P-value
1	Voice and government accountability	-0.85	-3.30	0.0003
2	Political Stability and Absence of Violence	0.65	2.69	0.0225
3	Government effectiveness	0.53	1.97	0.0772
4	Regulatory quality	-0.19	-0.61	0.5561
5	Rule of law	0.07	0.21	0.8403
6	Control of corruption	-0.34	-1.15	0.2773

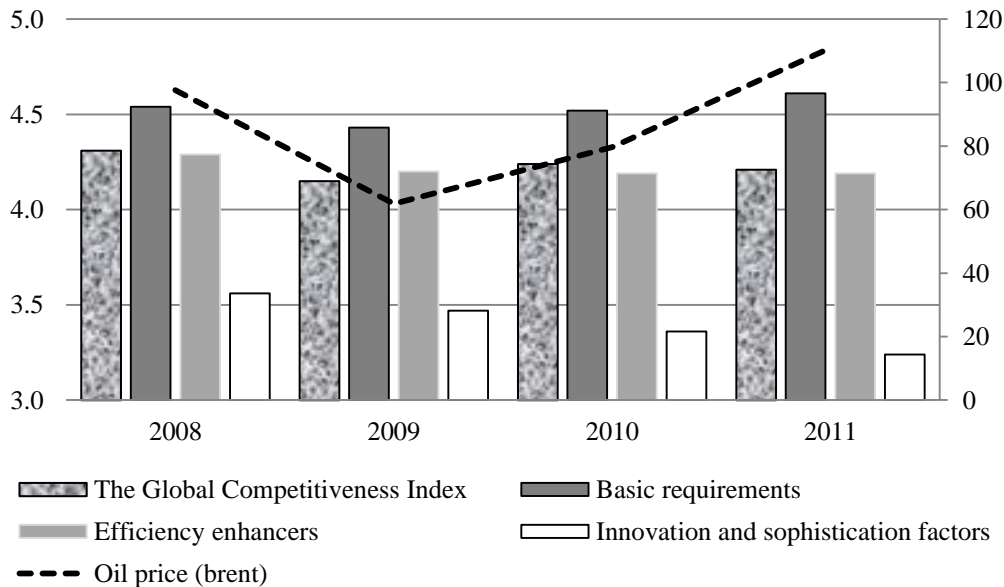
Sources: authors' estimates based on the data by World Bank: Worldwide Governance Indicators ([www.govindicators.org](http://www.govindicators.org)).

In Russia, the negative relationship between the oil price and the index of voice and government accountability happened to be pronounced most strongly. The correlation coefficient for the country was -0.85, while for the group of oil exporting countries taken as a whole it was -0.79. Correlation between the index of political stability and the oil price in Russia happened to be the same as in the group of the oil exporting countries taken as a whole.

The statistical relationship between the government effectiveness and the oil price in Russia is positive, significant and rather close contrary to the situation in the group of oil exporting countries taken as a whole. By contrast, the regulatory quality in Russia was characterized by a negligible

negative relationship with the oil price while on average for the group of the oil exporting countries it was positively and statistically significantly related to it.

In Russia, as in the other oil exporting countries role of the major factors of competitiveness was played by the basic requirements determined by the macroeconomic parameters of development. Fig. 8 shows that the dynamics of the major factors of Russia's competitiveness fully coincides with fluctuations of the world oil prices.



Source: authors' estimates based on the data from: The Global Competitiveness Report (2011-2012, 2010-2011, 2009-2010, 2008-2009), pp. 16-17.

*Fig 8. Russia's factors of competitiveness and the oil price dynamics*

The factors belonging to the efficiency enhancers block are second in importance for the country 2010-2011, 2009 period and Russia was characterized by a higher point in comparison to the average level of the oil exporting countries. For the most part, this is due to the fact that when determining this parameter (and in this respect Russia ranked the 8<sup>th</sup> among the countries covered by the competitiveness survey) the size of the domestic market is taken into consideration.

Russia fared worse than the group of the oil exporting countries taken as a whole when it comes to the innovation and sophistication factors. The contribution of this sub-index into competitiveness of the country was going down throughout the period of the oil price increase reaching 3.24 in 2011, while on average for the group it was 3.38. Overall, the competitiveness of the Russian economy in the same year was higher than the average competitiveness of the oil exporting countries (4.21 against 4.04). For the most part, that was due to higher values of the indicators of the basic requirements and efficiency enhancers for Russia than the group of the oil exporting countries.

Thus, Russia enjoys a potential to enhance competitiveness of its economy through its

efficiency growth. Lowering of the government accountability with increasing of the oil price can be a hurdle to that. The political stability cannot be viewed as a pure benefit as it can cause an economic stagnation and slowdown with the necessary reforms. In particular, recently, the contribution of innovation and sophistication factors in ensuring the country's competitiveness has diminished significantly and turned out to be lower than the average level for the oil exporting countries. Shrinking of the investment freedom and property rights that happened in Russia in the period of oil prices boom resulted in contraction of demand for innovation in the country.

At same time, Russia enjoys a considerable potential for enhancing competitiveness of the national economy on the basis of the potentially wide domestic market and monetary freedom existing in the periods of the world oil prices increase.

In summary, we have reviewed the positions of the oil exporting countries with regard to three international ratings and oil prices increase, governance quality and global competitiveness. The statistical analysis that we have performed opened the way to arriving at the following results.

First, the oil price increase produces a mixed effect of the index of economic freedom. This is related to the fact that it comprises both the components by their nature positively depending on additional financial inputs into the country (the way to arrival freedom, trade freedom, monetary freedom, government spending) and the components negatively affected by an inflow into the country of unsecured amounts of the resource rent (business freedom, investment freedom, property rights and freedom from corruption). Practically all the sub-indexes of economic freedom negatively dependent on the oil price dynamics serve as characteristics of the economic institutions existing in the country.

The statistical relationship between the oil price and governance quality is a controversial also. In the periods of the oil price increase in the oil exporting countries voice and government accountability were diminishing. At the same time, political stability was growing, violence diminishing, and regulatory quality improving. No statistically significant effect of the oil price increase on rule of law, control of corruption and government effectiveness for the group of the oil exporting countries has been observed. To a greater degree this relationship is due to the individual features of specific countries.

The structure of the global competitiveness index in the oil exporting countries reflects their strengths and weaknesses. With the oil price increase, the role of the innovation and sophistication factors in securing competitiveness of this group of countries was noticeably diminishing alongside with a decline in efficiency of their economies.

Such are the key trends in the economic and political development, characteristic, on average, of the group of the oil exporting countries. Let us dwell on the distinctive effect the oil price produces on the quality of institutional environment in Russia.

In the periods of the oil price increase in Russia the indicators of freedom of trade and monetary freedom were displaying the most significant rise. At the same time the indicators of investment freedom and property rights were displaying the most marked setback. As in the group of oil-exporting countries taken as a whole, in Russia no statistically significant effect of the oil price on

rule of law and control of corruption has been observed.

It will be noted that the basic factors of Russia as a whole, in Russia no statistically significant effect of the oil price on rule of law and control of corruption has been observed. Investment in innovation and sophistication factors into securing the country's competitiveness has diminished significantly and dropped below the average level of the oil exporting nations. However, Russia still enjoys a higher economic growth potential than the rest of the oil exporting nations due to the size of its domestic market.

\* \* \*

The analysis performed in the course of the study has demonstrated that Russia, as other countries delivering large amounts of oil to the world market, encounters the problem of barriers to political and economic changes. In the political field it manifests itself as a decrease in the value of the index of voice and government accountability along with an increase in the value of the index of political stability. In the economic field it makes itself felt in the form of the diminishing role of innovation and sophistication in the country's economic development. The observed patterns are, in general, but in Russia they become more prominent.

Quite a few researchers have proposed measures aimed to reverse the negative trends in Russia's economy<sup>69</sup>. Predominantly, they go no further than limiting the resource rent flow into the country's economy in order to support the macroeconomic stability and to stimulate foreign investment that can serve as a channel for transferring new technologies and institutional business practices characteristic of the developed nations. We believe pursuing a policy of diversification of the economy and exports is most important for reversing the above negative trends in Russia's development.

#### **Annex 1**

The energy exporting countries are understood to be the countries where the share of net oil exports in the total exports exceeds 10%. The list of such countries is given below in descending order of the oil exports share.

№	Country	Net exports share in the total exports, %
1	Iraq	93.5
2	Libya	88.9
3	Oman	86.4
4	Iran	85.0
5	Saudi Arabia	84.0
6	Yemen	79.4
7	Nigeria	79.1

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<sup>69</sup>In particular, mention may be made of the paper by Guriev S., Plekhanov A., Sonin K.: Economic Mechanism of Resource-based Model of Development // *Voprosy Ekonomiki*, 2010. № 3. p. 4-23.

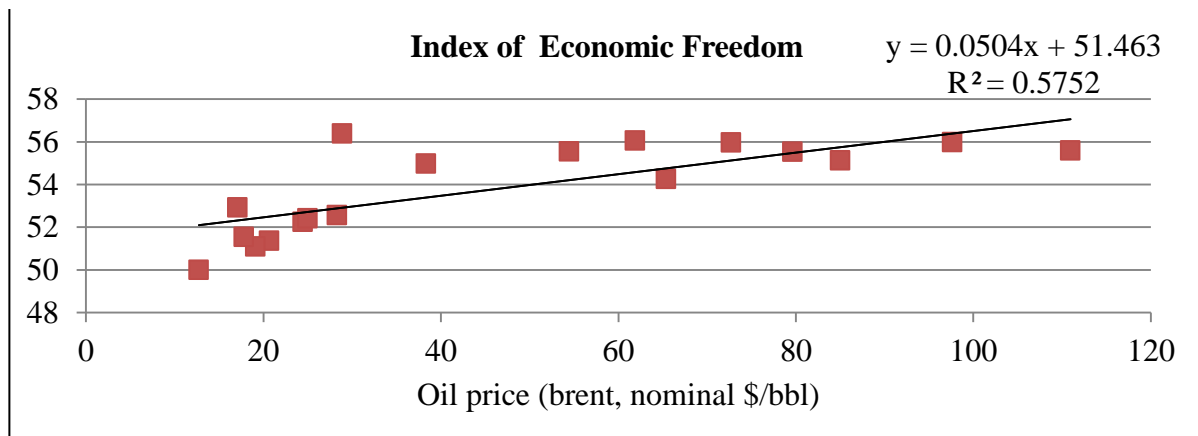
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**International Monetary System, Energy and Sustainable Development**

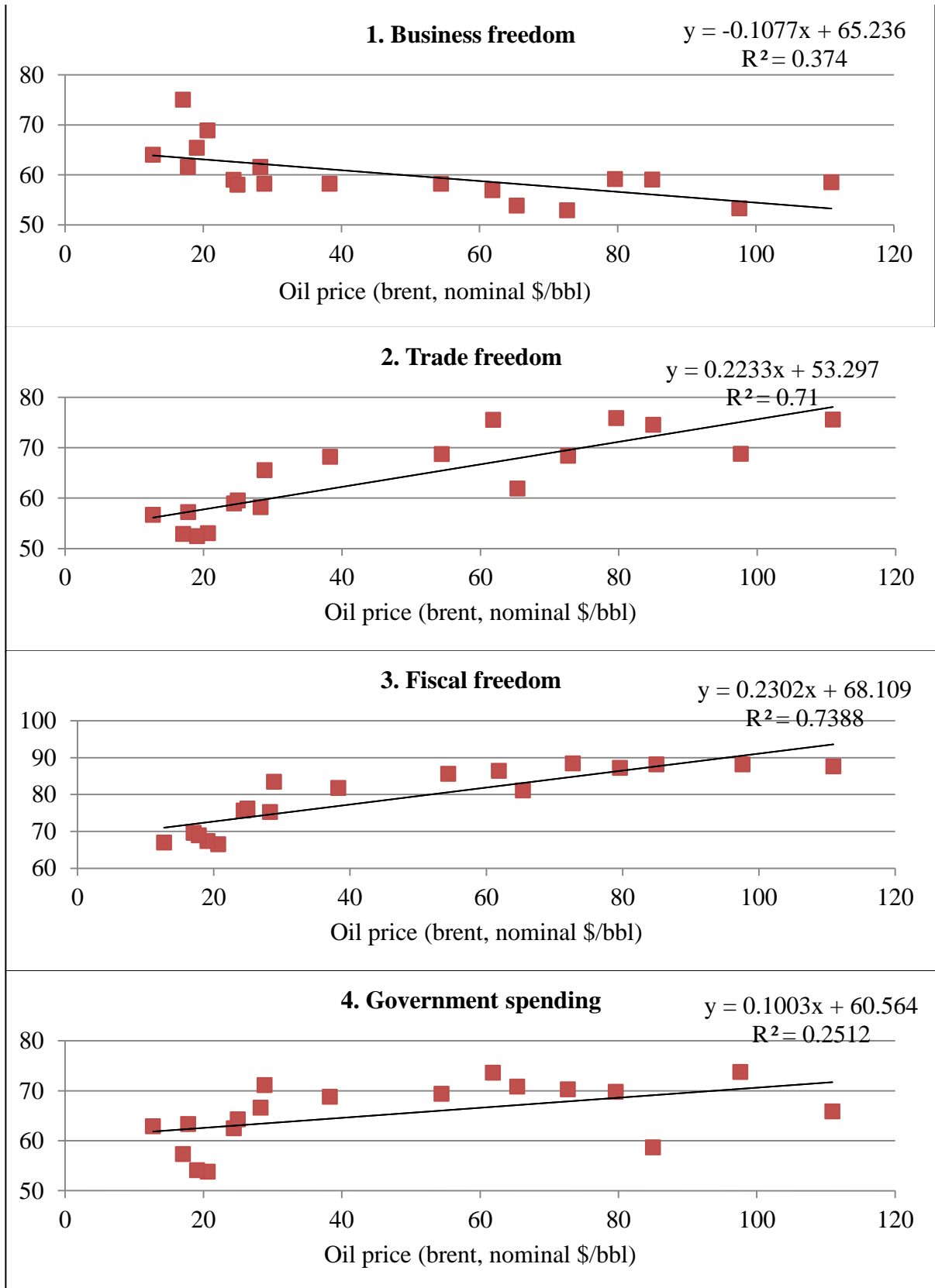
8	United Arab Emirates	69.9
9	Chad	68.2
10	Angola	68.0
11	Kuwait	67.7
12	Venezuela	57.3
13	Republic of Congo	56.2
14	Algiers	53.7
15	Syria	51.0
16	Azerbaijan	45.2
17	Kazakhstan	42.8
18	Sudan	39.0
19	Cameroon	33.0
20	Egypt	30.2
21	Ecuador	29.6
22	Russia	28.7
23	Indonesia	24.3
24	Papua New Guinea	19.9
25	Mexico	16.1
26	Vietnam	16.1
27	Tunisia	14.5
28	Democratic Republic of Congo	14.3
29	Columbia	12.0
	<i>Average</i>	<i>50.1</i>

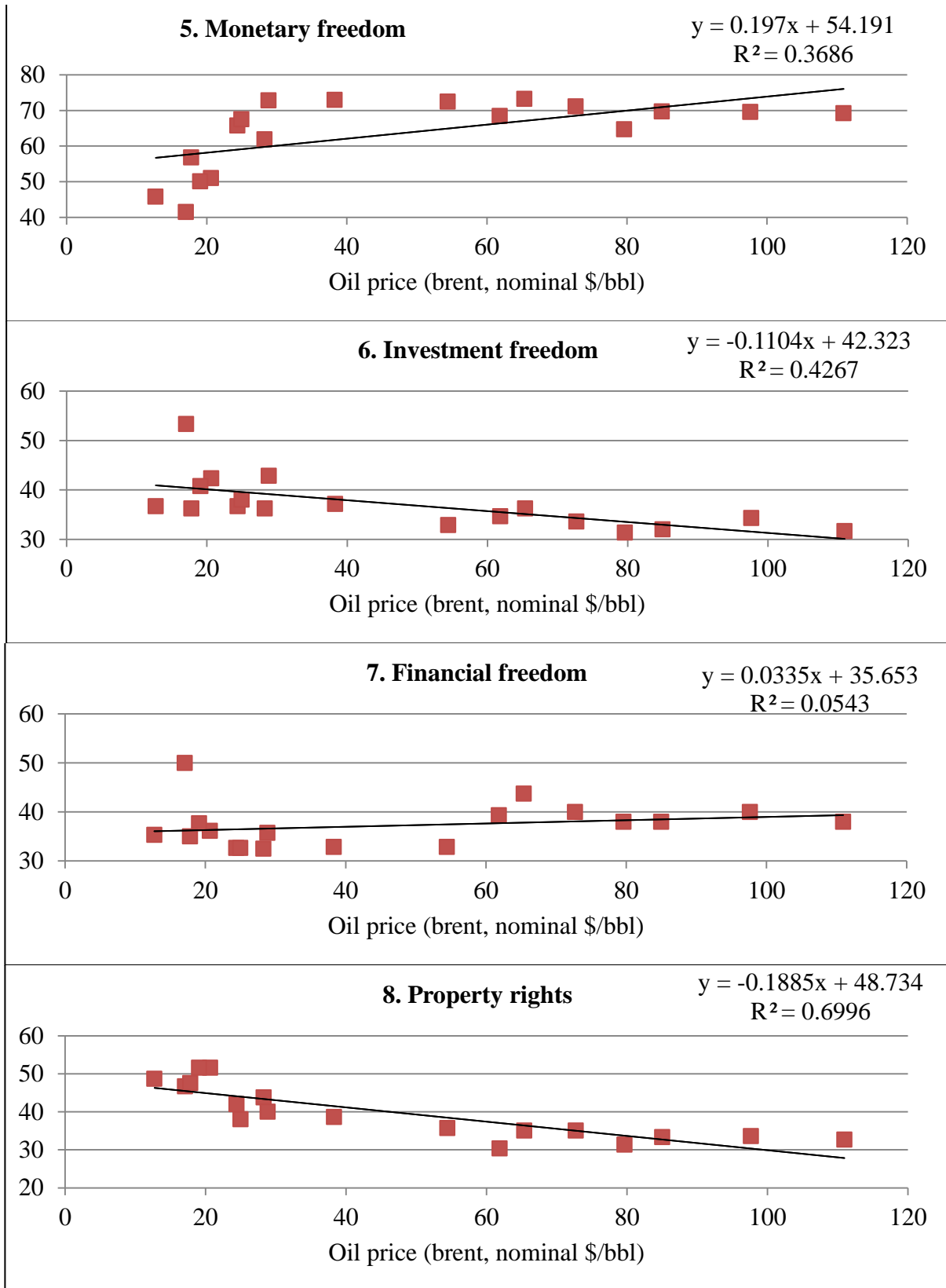
Source: World Economic Outlook April 2012. – International Monetary Fund, pp. 153-154.

**Annex 2.**

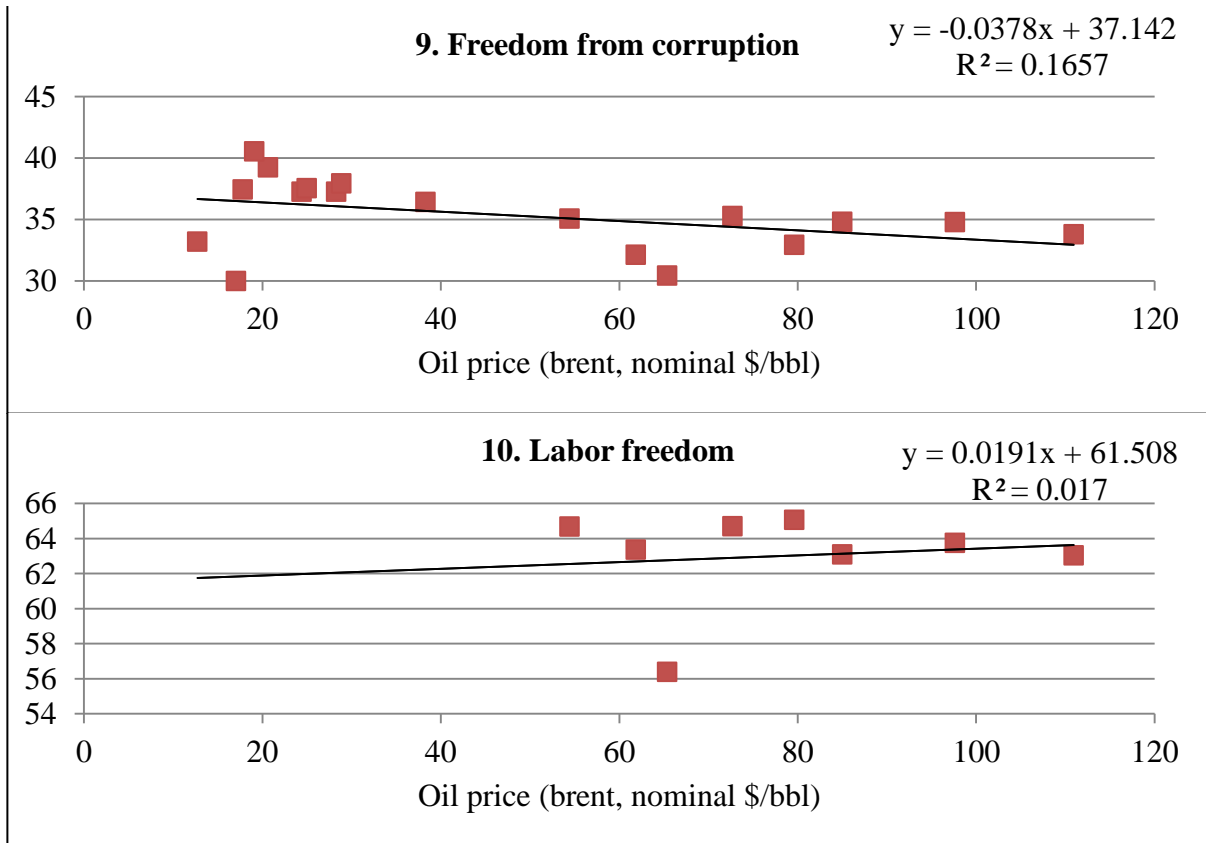
Diagram of relationship between the average values of the index of economic freedom and its components for the group of oil exporting countries and the world market oil prices.





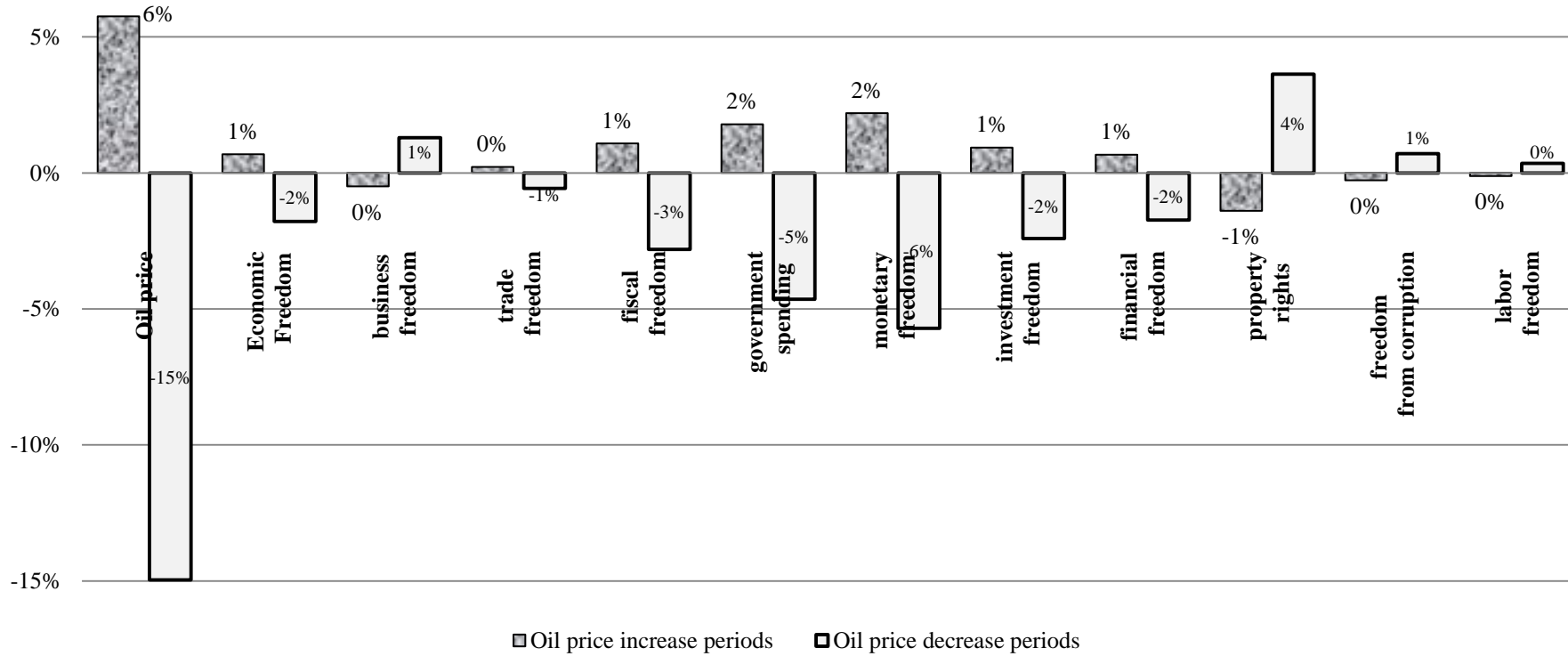






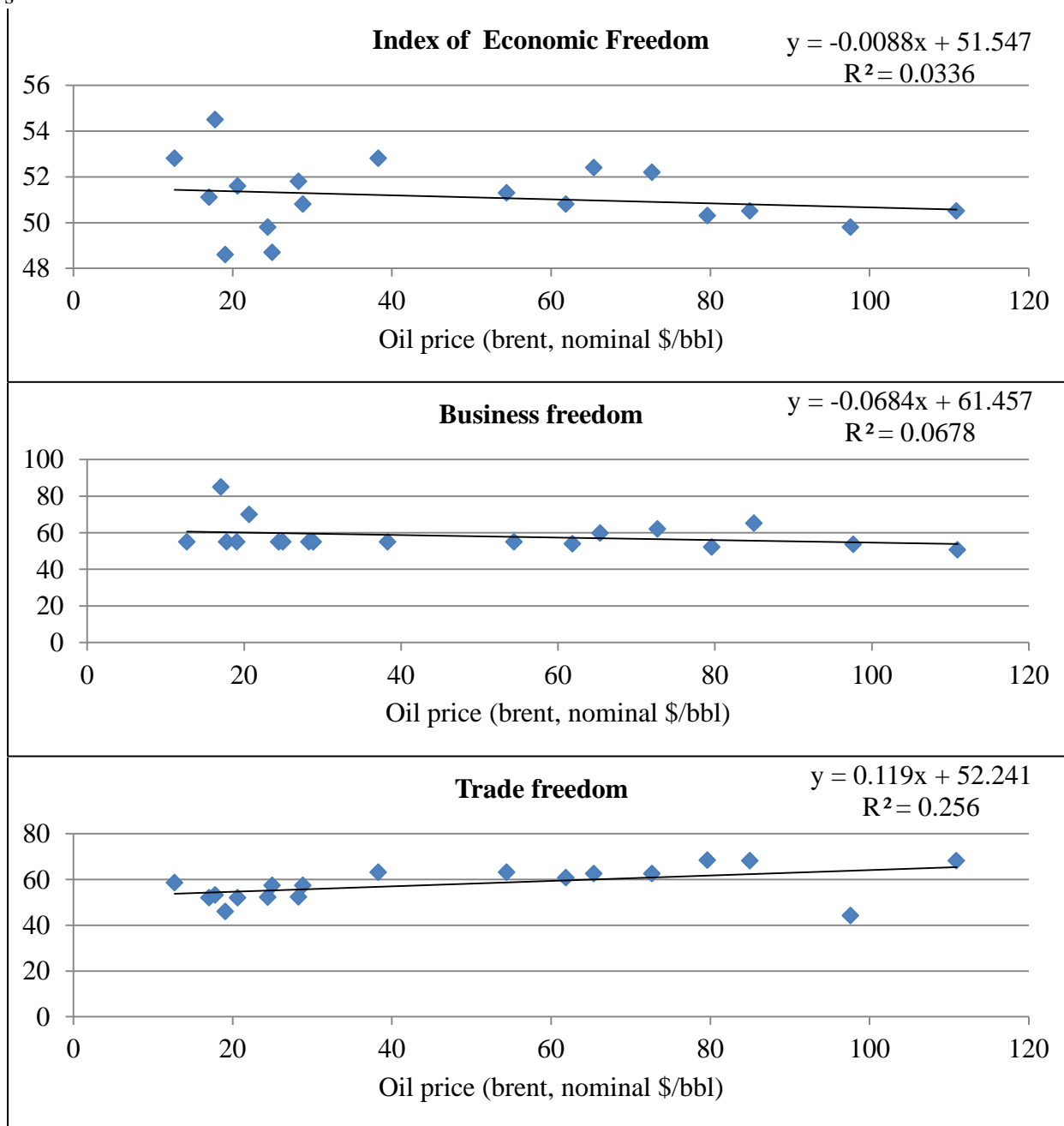
**Annex 3.**

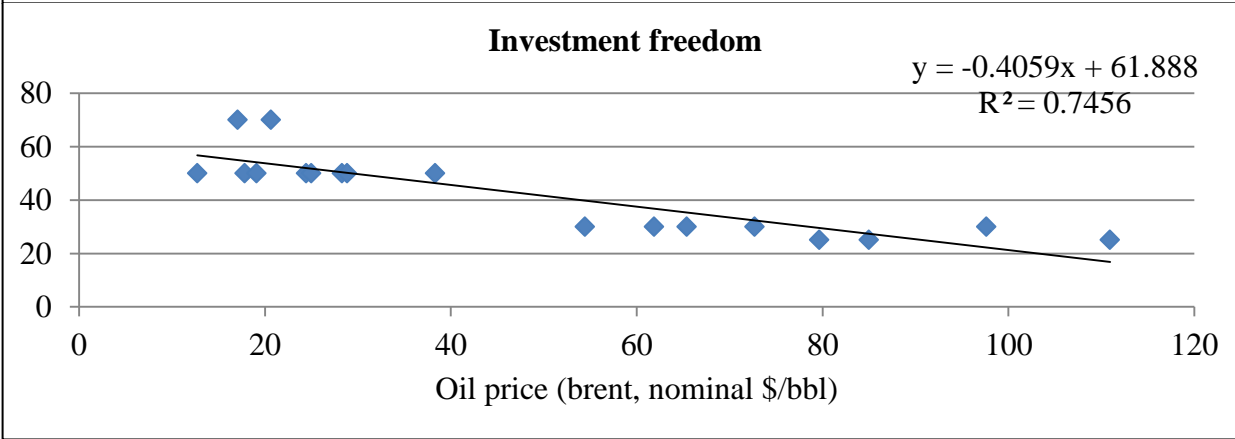
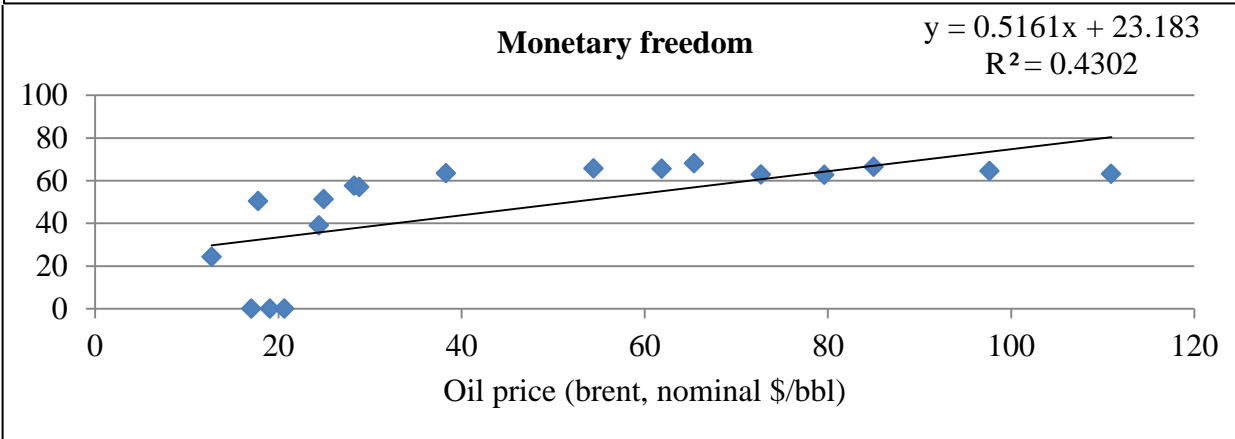
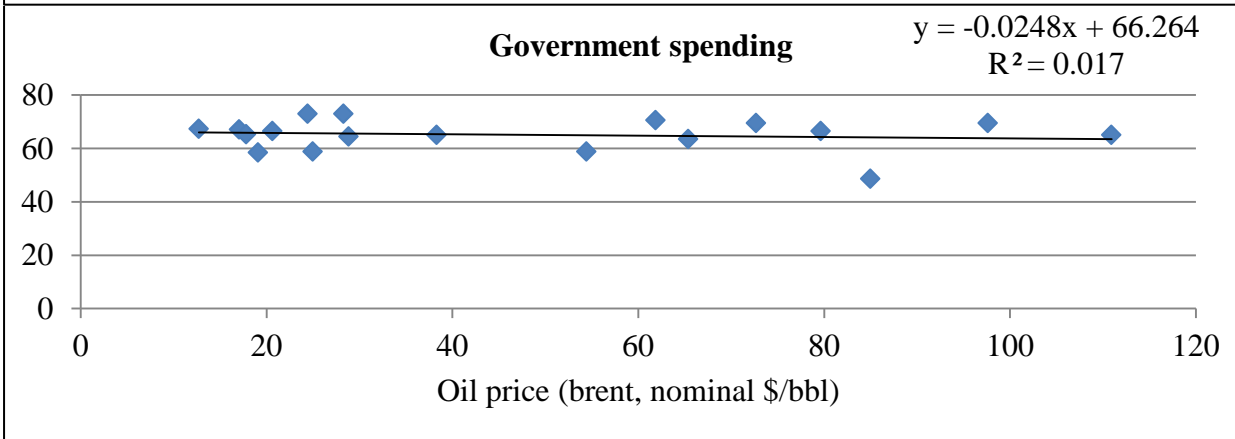
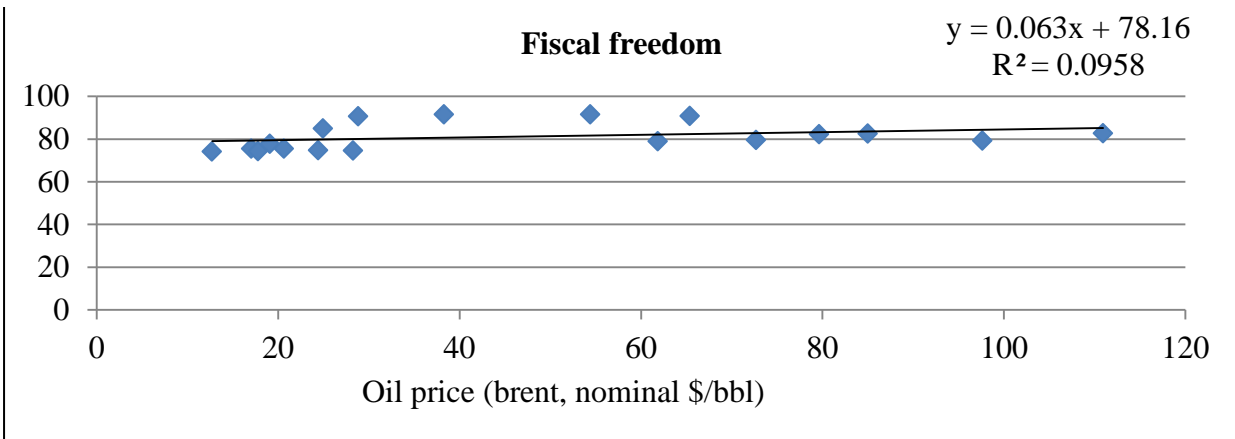
Percentage of deviation of the oil price and the indexes of economic freedom from their average values in the course of oil price increase and oil price decrease periods on the world markets in 1995-2012.

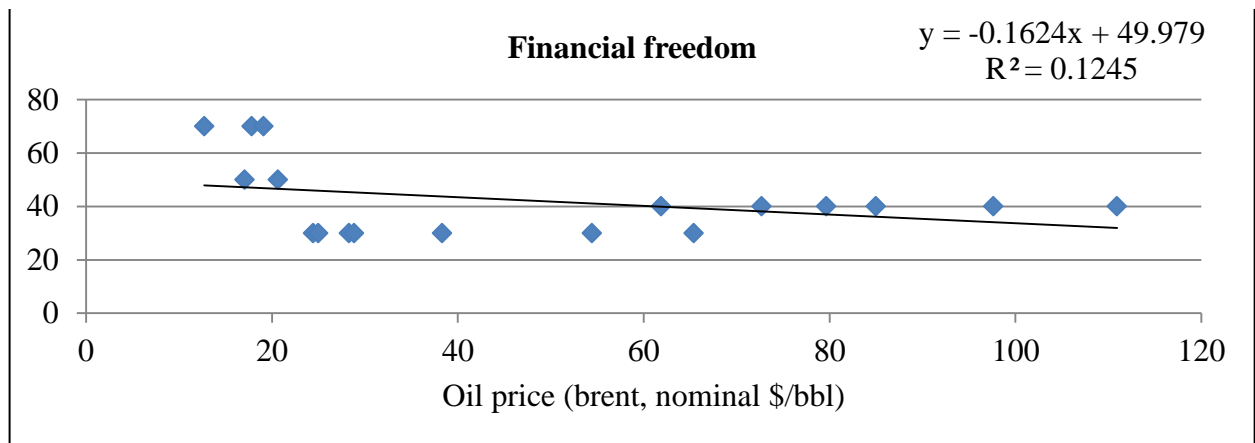


**Annex 4.**

Changes in the index of economic freedom and its components in Russia depending on the world market oil prices

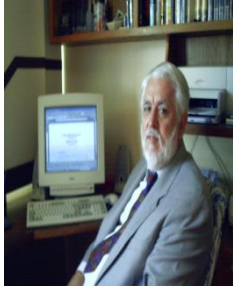






## Session 3

# Green Growth and Sustainable Development



### Presentation 2

## Adilson de Oliveira

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Professor Adilson de Oliveira is a Chemical Engineer with a Ph.D in Development Economics, from Grenoble University (France) and a Specialisation Degree on in Energy Economics from the Institut Economique et Juridique de l'Energie, Grenoble, France. He has several papers published both in Brazilian and International Journals and he has acted as consultant to international (World Bank, Latin-American Energy Organization, the European Union) and Brazilian organizations (energy regulators, the Ministry of Energy, energy companies). In the last years, he has been advising the Brazilian Government on policies for the national content for the domestic oil and gas industry. He is currently Full Professor of Economics at the Institute of Economics, Federal University of Rio de Janeiro.

## The Global Oil Market: An Outlook from South America

### 1. Introduction

The industrial revolution was associated with a radical change in the consumption of energy (Mumford, 1950). Fossil fuels replaced renewable energy sources enabling the development of economic activities where energy resources are scarce. GDP growth and energy consumption became strongly correlated (Darmstadter, 1971) and the supply of fossil fuels became a critical issue in the process of economic development ever since.

In the XX century, oil replaced coal at the centre stage of the world energy market. This process was pushed by the development of the automobile industry but largely facilitated by the plentiful supply of oil at stable and relatively low prices.

The 1970's oil crisis generated a new context for the oil industry. The barriers introduced by OPEC to its oil resources (Nore and Turner, 1980) underscored the risk of oil scarcity suggested by the Meadows report (Meadows & alii, 1972). Oil price jumped to a higher level creating many opportunities for the development of offshore oil resources (Grenon, 1975). Several Non-OPEC countries joined the supply of oil, reducing the perception of oil scarcity.

After a few years of relative tranquility, the oil market entered a new period of turbulence. Large uncertainties from both sides, supply and demand, are moving the oil price up and down randomly. This situation is unhealthy for the global economy. Oil is still a central piece of the world energy system. The reliable supply of oil at an adequate price is critical for a sustainable transition to a low carbon economy.

In theory, the oil price should be high enough to stimulate the search for new sources of oil supply (Adelman, 1993) but it must be sufficiently low to promote sustainable economic growth as well. This complex equation is mediated by regulations imposed by the oil producing countries, that intend to maximize their oil revenues, and by the oil consuming countries that provide incentives for the sustainable transition of their economies to a low carbon economy.

The Middle East plays a central role in the supply of oil to the world economy but the political instability in the region diminishes the reliability of its supply. This situation is a major source of the current volatility in the oil price but not the single one. Uncertainties concerning the way out of the current economic crisis and the pace of the transition to a low carbon economy are relevant as well.

In these circumstances, policy makers have great difficulties to establish their energy policies. Should they keep relying on oil and for how long? What should be the speed and the sort of program for alternative sources of energy? Where and how should they search for a secure oil supply for their

economies? What sort of cooperation agreements should they look for to improve the price stability of their energy imports?

The next section of this paper examines the current oil market situation from the point of view of security of supply. The global oil consumption, production, trade and reserves are visited to offer a panorama of the different regions in the oil market. The following section analyses the outlook of the oil market. It highlights the fact that oil is expected to remain the central piece of the world energy system but the role of the Middle East in the global oil supply should be changed by the development of new sources of liquid fuels, especially in the Americas.

Section four is dedicated to assess the forces that are moving the oil price. It indicates that the oil market entered a period of unstable equilibrium in the 1970's as result of restrictions for the access to the resources of the oil exporting countries, from the supply side, and the shift in the oil demand growth to the emerging countries, from the demand side. It suggests that the expected increase in the supply of liquid fuels in the Atlantic basin should mitigate the oil price volatility. The following section assesses the role that South America, and especially Brazil, can play in this process.

## 2. The Oil Market Situation

Although the transition to a low oil economy was announced in the 1970's, oil remains at the core of the world energy system. In 2011, the world oil consumption reached 88 million b/d, representing 33.1% of the world energy consumption (Table 1). The OECD reduced by 1.2% its oil consumption (600,000 b/d) but the non-OECD countries increased their oil consumption by 2.8% (1.2 million b/d), largely due to China. The oil share in the global energy supply is diminishing but the hydrocarbons (oil plus natural gas) remain the leading primary energy sources used by the world. Oil is particularly relevant for the supply of energy for transportation, a critical building block of trade. Indeed, over 90% of the world transport system operates by consuming oil derivatives. It is important to note that there are no significant differences in the hydrocarbons dependence among the regions of the world, except in the Middle East that is almost entirely dependent of oil and natural gas.

**Table 1. Energy Consumption (%)**

<b>Energy Source</b>	<b>2011</b>
<b>Oil</b>	<b>33.1</b>
<b>Natural Gas</b>	<b>23.7</b>
<b>Coal</b>	<b>30.3</b>
<b>Nuclear</b>	<b>4.9</b>
<b>Hydropower</b>	<b>6.4</b>
<b>Renewables</b>	<b>1.6</b>
<b>Total (MToe)</b>	<b>12,274,6</b>

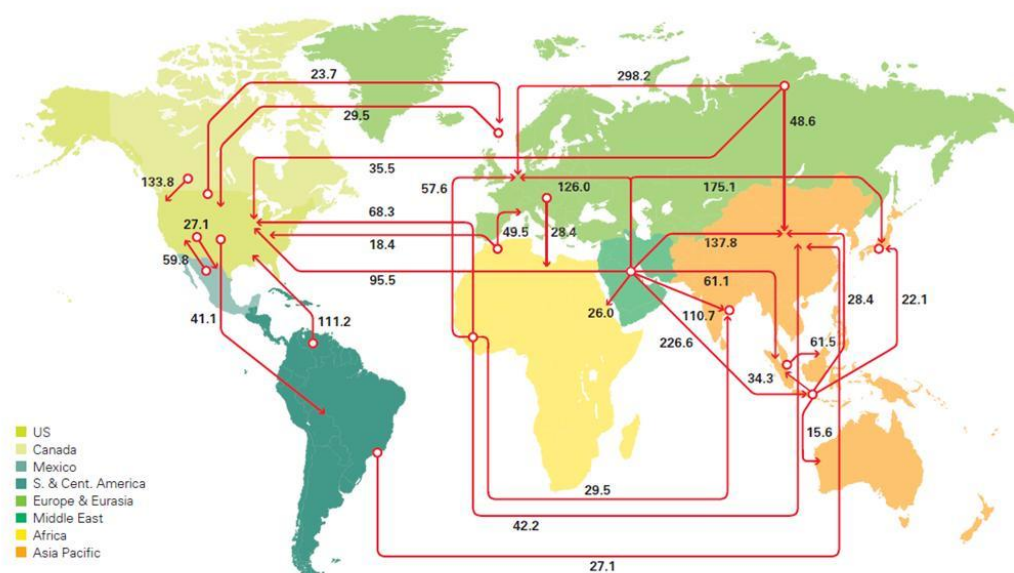
Source: BP Statistical Review 2012



The current flows of oil trade show contrasting regional situations. Among the oil importing regions, North America is in a relatively comfortable situation from its supply point of view. The region produces 61.6% of its oil consumption and a large share of its oil imports (34%) comes from South America and West Africa (20.7%). Only 29% of its imports are originated in the politically troubled Middle East (Figure 1). Moreover, after a long period of decline, the regional supply of oil production started to increase pushed by the production unconventional hydrocarbon resources. The exploitation of unconventional natural gas is the main strategy announced to reduce oil imports and to mitigate climate change in the US (Wright, 2012).

Figure 1

Regional World Oil Trade



Source: BP Statistical Review 2012

Europe is in a different situation. The oil production in the North Sea is declining and the region imports 71.5% of its oil consumption, largely from the former Soviet Union (56.1%), from the Middle East (23.6%) and from North Africa (9.3%). Only a small share of the European oil imports comes from West Africa (10.8%) and the region has been unable to get relevant access to the oil resources in South America so far (Figure 1). Moreover, the region is largely dependent of natural gas imports as well. The European countries agreed that improvements in efficiency should be a relevant aspect of their energy policy but are unable to establish a clear strategy to reduce the region's dependence on oil imports. France has chosen nuclear power while Germany is phasing out its nuclear power plants to concentrate its strategy on renewable energy sources.

Asia, like Europe, is strongly dependent on oil and natural gas imports. However, differently from Europe, the Asian imports are concentrated in the Middle East (Figure 1). A reasonable (and

potentially increasing) share of the Asian oil imports come from West Africa and South America but the region is vulnerable to the avatars of oil supply from the Middle East. Poor in hydrocarbon but rich in coal resources, Asia elected nuclear power and to a lesser extent wind power to reduce its dependence on oil imports and to mitigate carbon emissions as well.

The Fukushima accident had a dramatic effect on this strategy. The Japanese government was forced to stop the nuclear power supply to accommodate the population reaction to the environmental impacts of the accident. The economic effects of this decision induced the Japanese government to review the decision despite popular dissatisfaction. The displacement of coal in the energy mix and a strategy for a secure oil supply are likely to dominate the outlook of the Asian energy policy.

The Middle East dominates the supply side of the world oil trade (51.8%). The former Soviet countries and Africa (Northern and Southern Sahara) provide a large share of the remaining oil supply (23.7% and 18%), and South America is a relatively small (6%) but growing supplier to oil importing countries. This region has vast underdeveloped oil reserves (311 billion barrels) and the offshore oil resources recently identified in the pre-salt layer of the sedimentary basins are expected to add another 90 billion barrels.<sup>70</sup> The share of the South American supply to the world oil trade is expected to increase in the next years. Brazil should be associated with most of this increase because, differently from the heavy Venezuelan oil, its crude is light. It can adequately fit the needs of the existing oil refineries.

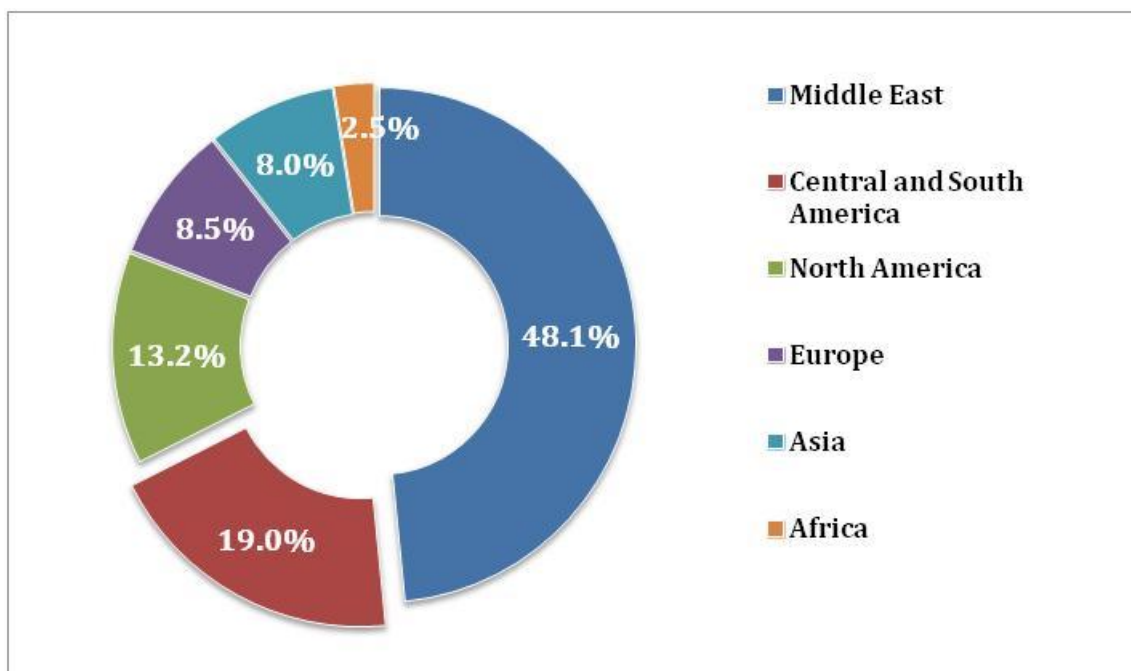
The currently known oil reserves can supply 46 years of the current consumption (BP, 2012). This figure suggests that there is no risk of oil shortage in the foreseeable future. However, these reserves are concentrated in a few countries of the Middle East (40%). The remaining reserves are regionally dispersed but concentrated in a few countries as well (Figure 2). These reserves, with the exception of those placed in OECD countries, are controlled by national oil companies (NOCs) that need financial and technological support from the OECD countries to develop these resources (Victor, Hults and Thurber, 2012). The volume and the regional dispersion of the future oil supply will largely result from the cooperation agreements that the NOCs will be able (need?) to establish with the international oil and servicing companies.

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<sup>70</sup> A report from Gaffney Gaffney, Cline & Associates estimates that the Brazilian offshore oil resources are similar to the existent in Venezuela and Canada.

FIGURE 2

World Oil Reserves (1.65 Billion Barrels)



Source: BP Statistical Review 2012

### 3. The Outlook for Oil Supply and Demand<sup>71</sup>

So far, the world energy consumption has been largely driven by the OECD countries. The 21st century announces a fundamental change in this trajectory. It is expected that the energy consumption at the OECD should slow down to an annual increase of 0.2 % while the energy consumption at the Non-OECD countries should increase at 2.7% a year. Another 4.6 Billion Toe would be added to the 2010 world energy consumption by 2030. The bulk of this increase should be in the Non-OECD countries (96%).

These dissimilar energy trajectories reflect differences in the path of population growth and the pattern of economic activities in the two country categories (Finley, 2012). The population is expected to stagnate in the OECD countries and the GDP growth will be driven by low energy intensive activities. In Non-OECD countries, population shall increase and the GDP growth will be based on energy intensive activities.

Fossil fuels should remain the core of the world energy system used to supply the increasing

<sup>71</sup> This section is largely based on the BP Energy Outlook 2030 scenario (BP, 2012).

demand, in spite of the scientific consensus that climate change is a serious problem (Stern, 2007). Alternative energy sources are costly and the replacement of the existing infrastructure used to produce, transform, transport and consume fossil fuels will take time. The BP study suggests that the fossil fuels should represent more than 80% of the world energy consumption by 2030 (Table 2).

In the 1970's, nuclear power was expected to be the core of the power system expansion. This energy source lost the public confidence regarding its ability to provide a safe energy supply following the accidents in Three Mile Island and Tchernobyl. A large effort was made after that to recover public confidence in nuclear power, newly reverted by the Fukushima accident. The difficulty that the nuclear industry finds to establish a reliable cooperation agreement on the proliferation of nuclear weapons is an important, additional obstacle to the widespread use of this primary energy source. Nevertheless, it is expected that nuclear power should gain some share in the world energy system, especially in Asia.

Table 2  
 Energy Consumption Outlook (%)

<b>Source/Year</b>	<b>2030</b>
Oil	27.2
Natural Gas	25.9
Coal	27.7
Nuclear	6.0
Hydro	6.8
Renewable	6.3
Total (MToe)	16,604.7

Source: BP Energy Outlook 2012

The share of renewable energy sources in the world energy system should continue to increase rapidly. This movement is induced by regulations and financial incentives that aim to reduce both the risk of climate change and the dependence on oil imports, particularly in the OECD countries. In the Non-OCDE countries, the main driving force is the availability of several hydropower sites not yet exploited, mainly in South America and Central Africa.

Among the fossil fuels, the consumption of natural gas should increase substantially (2.1% a year until 2030) in both OECD and Non-OECD countries. In North America, the supply of relatively cheap unconventional gas (shale gas and coal bed methane) will increase rapidly and this region can become a net exporter of this fuel in the long term (Helman, 2012). Outside North America, the production of unconventional hydrocarbons is in its infancy but it is likely to gain momentum in Asia (especially in China) and in South America. In the OECD countries, natural gas will be largely used in

gas fired power plants to replace old, inefficient coal fired power plants, especially in North America. In the Non-OECD countries, the increase in the consumption of natural gas will be largely oriented to supply the energy demand of industry as yet.

Coal is the main primary energy source used to generate electricity. To supply their fast growing demand for power, the emerging economies of Asia should stick to coal fired power plants in the foreseeable future. Nuclear power and renewable power are expensive options that demand large upfront investments for which countries are short in. Their increasing consumption should offset the reduced coal consumption in the OCDE countries.

Oil is expected to continue the trajectory of lowering its share in the world energy system initiated in the 1970's. However, the world oil consumption is expected to increase by 0.7% a year, despite the set of policies that aim to reduce oil consumption. The OECD and the Non-OECD regions should show contrasted trends. Indeed, the OCDE should reduce its oil consumption to 4 Mb/d by 2030 while the Non-OECD countries, especially the emerging economies, are expected to increase their oil consumption steadily. The main reason for these contrasting trends is that the demand for mobility that should increase rapidly in the emerging economies but to slow down in the OCDE countries.<sup>72</sup> China is expected to add 8 Mb/d to the world oil demand (and India another 4.5 Mb/d) offsetting the reduction of the oil consumption in the OECD region.

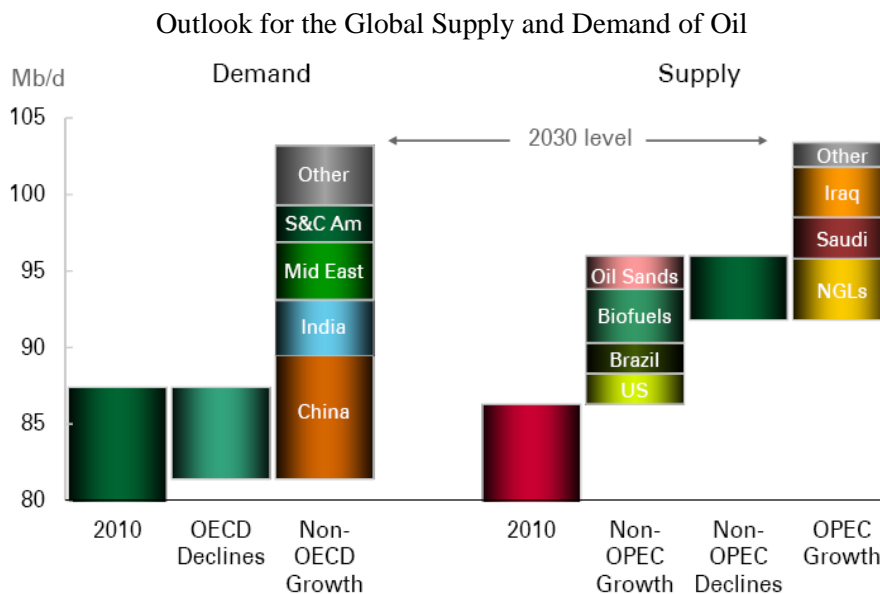
OPEC, and especially the Middle East, is expected to be the main source of the additional supply to meet increases in the oil demand because of the concentration of oil reserves in the region. Unsurprisingly, the scenario proposed by BP suggests that 70% of the additional oil supply should come from OPEC, largely from Saudi Arabia and from Iraq that should increase their oil production by 3 Mb/d each (Figure 3). The BP Middle East share of the global oil supply would increase to 34% (29% nowadays) and the region share in the oil trade should rise to 25% (22% nowadays). This scenario suggests that Russia should increase its oil production but only to sustain its oil market share and that OPEC should increase its supply of NGL by 3 Mb/d.

The radical change in the oil supply outlook should occur in the Atlantic basin. The development of unconventional hydrocarbon resources should add 4.4 M b/d (2.2 M b/d from the oil sands of Canada and 2M b/d of shale oil from the US) and the Brazilian supply of light oil will contribute with another 2 Mb/d to the current world oil supply. To fill the supply gap of liquid fuels, the scenario estimates that the production of biofuels should increase 3.5 Mb/d, half of which coming from Brazi

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<sup>72</sup> The global vehicle fleet is expected to grow 60% in the next 20 years and more than three quarter of this growth will occur in the non-OECD countries (BP, 2012).

Figure 3

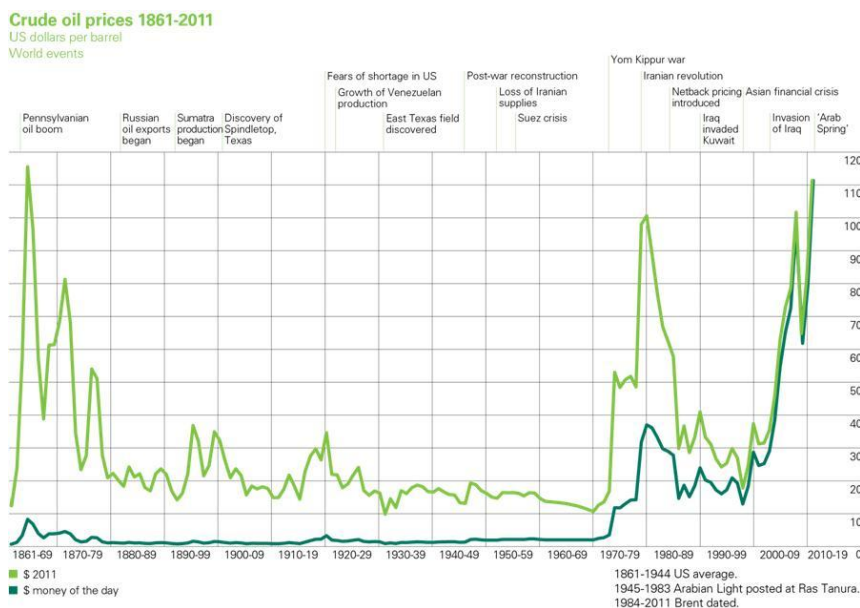


Source: BP, 2012

#### 4. The Oil Price

After an initial period of turbulence (Figure 4), oil prices had a long period of relative stability, governed by a group of international oil companies (IOCs) under the geopolitical umbrella of the large oil consuming countries (Yergin, 1991). This situation started to change after OPEC emerged in the oil scenario and the developing countries' oil consumption started to increase rapidly (Dvir and Rogoff, 2010).

Figure 4



Source: BP Oil Slide Pack 2012

In the 1970's, a new period of price turbulence commenced as result of radical changes in the fundamentals of the oil market. The political events in the Middle East escalated the oil price to a new, higher level, improving the economic viability of the untapped offshore oil resources. Several Non-OPEC oil producing countries took advantage of this new situation to develop their oil production. Meanwhile, the large oil importing countries created the International Energy Agency to coordinate policies that could counterbalance the market power of OPEC.

Although the share of OPEC in the global supply of oil was reduced from 47% to 42%, an unstable equilibrium emerged from this new situation. The international oil companies (IOCs) governing the demand side of the oil market while the national oil companies (NOCs) were taking control of the supply side of the market (Victor & alii, 2012). Saudi Arabia captured the leading role at the OPEC side, using its spare capacity to smooth any unexpected large disruptions in the oil supply. The US took the chief role in the IEA side, managing its strategic oil stockpile to mitigate short term instabilities in the oil market and mainly providing security for the oil flow from the Middle East to the international market.

The escalation of the oil price retreated but its volatility emerged as a damaging effect for the world economy (Guo & Kliesen, 2005). The financial market perceived this situation as an opportunity to offer hedge ("paper" oil) to the oil market players willing to mitigate their price risk. This movement improved the oil price stability, diminishing the negative effects of its volatility. Assuming that by adding different types of risk the oil price volatility would be reduced, institutional investors started to use their "paper" oil to manage different types of financial risks, not associated with the oil market (Lipsky, 2009). The uncertainties of the oil market were linked to the uncertainties of the financial markets.

The unstable equilibrium in the oil market was broken at the beginning of the 21st century (Kilian, 2009). From the demand side, the economic growth of emerging economies, especially China, shifted the core of the increase in oil demand to the Non-OECD countries. From the supply side, the prospect that a tight oil market should increase revenues led the oil exporting countries to restrict access to their low cost oil resources.<sup>73</sup> The IOCs were induced to produce more expensive but accessible oil resources and the NOCs were encouraged to pay higher costs to move along the technological learning curve of oil exploration. The oil price escalated its higher historical level (figure 4).

Despite the complexity of this new market situation, the global oil supply did not experience a critical disruption. The oil strategic stockpiles of the OECD countries and the spare capacity of OPEC (especially Saudi Arabia) were used to guarantee the balance between supply and demand. However,

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<sup>73</sup> Large oil exporting countries revenues prefer to keep the oil resources in situ, expecting to have higher benefits from increases in the oil price (Victor & alii, 2012).

oil price became extremely volatile, especially after the global economic crisis created large uncertainties concerning the future oil demand and the reliability of oil supply from the Middle East was jeopardized by the political battle for democracy in the region.

The oil price volatility is a major source of damaging effects for the economy. Consumers search for protection for their revenues reducing their energy consumption while producers postpone investments to mitigate their economic risks. Moreover, the oil price volatility obscures the opportunity costs of alternative energy sources paralyzing investments in that direction. Although the use of “paper” oil can mitigate the oil price volatility in periods of economic stability, fluctuations in the oil price are largely determined by expectations concerning the fundamentals (of the oil market (Lipsky, 2009; Ait Laoussine & Gault, 2012)). A balanced outlook for the oil supply and its demand is essential to reduce the oil price volatility.

The world economy is less dependent of the oil supply but oil remains at the centre of the global energy system. A predictable, adequate price for oil is crucial for the sustainability of world economic development. Oil exporting and oil importing countries both have interests in removing the large uncertainties that are governing the oil price.

From the demand side, although the emerging countries are placed at the driving seat of the global oil consumption, the bulk of this consumption remains in the OCDE. The trajectory of the future world oil consumption will be largely determined by the OECD countries' energy policies. There are strong scientific evidences that the consumption of fossil fuels, including oil, must be drastically and rapidly reduced but such changes demand global action. No single country can curb the increasing consumption of fossil fuels.

At Kyoto, the concept of joint implementation but different responsibilities of the OECD countries and the developing countries was established, suggesting that the transition to a low carbon energy global economy would move forward. However, a practical agenda has not been established so far. The Rio+20 conference was expected to produce a leap forward in the energy transition but it had disappointing results (Watts & Ford, 2012). The costs of mitigating the risk of climate change are high and the recent economic crisis has considerably increased the difficulty to deal with this issue. Nevertheless, the climate change risk is still there. The transition to a low carbon economy should return to the top priority of the international agenda as soon as the current economic crisis is surmounted. Eventually, the world oil consumption will be reduced by the oil substitution to renewable energy sources.

From the supply side, the oil resources from the Middle East are essential to avoid major unbalances between the oil supply and its demand in the short term. However, technological innovation is bringing large amounts of unconventional sources of hydrocarbons to the market place. Moreover, large oil reservoirs are being identified in the pre-salt layer of the Atlantic Ocean continental platforms. This trend indicates that North America will reduce its dependence of oil



imports but Europe and especially Asia should remain largely dependent on oil imports from the Middle East, and that West Africa and East South America will be relevant regional players in the international oil trade in the near future.

Summing up, the oil price should reach a new level, superior to that prevalent in the 1990's<sup>74</sup> but its volatility should subside as the share of reliable oil supply from politically stable countries increases and an international agenda for the transition to a low carbon economy is agreed. The timing for this process is difficult to predict. Nevertheless, the cooperation between the OCDE and the Non-OCDE countries is essential to speed it up. The OCDE countries have the technological capabilities and the financial resources that the Non-OCDE countries need to develop their oil exports and to accelerate their energy transition as well.

## 5. The Outlook of South American Oil

South America is net exporter of oil. This situation is traditionally credited to the large oil supply from Venezuela that holds 17.9% (352.4 billion barrels) of the world oil reserves. However, the region exports are relatively small (1.1 Mb/d in 2001). This situation should radically change in the coming years as result of the identification of several large oil reservoirs in the pre-salt layer of the Brazilian deep offshore.

Until the 1970's, Brazil was perceived as poor country in terms of oil resources. The oil exploration efforts were confined to the onshore sedimentary basins, where only small reservoirs were found, and the IOCs had no access to the Brazilian oil resources. The national oil company (Petrobras) was the only company allowed to develop the domestic oil resources and Brazil was a large importer of oil.

In the 1970's, the oil industry move to the offshore opened a new era for the Brazilian oil industry (de Oliveira, 2012). Relatively large offshore oil reservoirs were identified by Petrobras and the access to the Brazilian oil resources was opened to the IOCs under the umbrella of Petrobras. In a period of transition from the military regime to democracy, this condition was not attractive to the IOCs. The domestic oil production increased slowly and Brazil remained largely dependent of oil imports.

In the 1990's, the transition to democracy was accomplished. The Petrobras monopoly on the oil resources was abandoned and the IOC's were offered fair access to the Brazilian oil resources. Several of them acquired oil exploration blocks attracted by the opportunity of access to a reliable source of oil supply. Most often, they opted to operate in partnership with Petrobras to take advantage of the company's extensive knowledge of the Brazilian sedimentary basins. The oil production reserves jumped from 4.8 to 15.1 billion barrels and the oil production from 643 thousand b/d to 2.2

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<sup>74</sup> A bottom up recent study estimates that the current oil production can increase to 110.6 million barrels per day if the barrel of oil is priced at US\$ 70 (Maugeri, 2012).

Mb/d between 1991 and 2011.

The identification of several gigantic oil reservoirs in the pre-salt area of the Campos and Santos basins opened a new scenario for the Brazilian oil industry. The oil reserves of these fields are estimated at 20 billion barrels and the geophysics data indicates that several other large reservoirs are likely to be found in the same area. It is expected that these new reservoirs can add another 50 or 70 billion barrels to the Brazilian oil reserves.<sup>75</sup> This optimistic perception is based on the fact that 50% of the new world oil reserves in the last 5 years were found in the deep offshore and that 63% of these discoveries were made in Brazil at a cost of US\$ 1.56 per barrel (Petrobras, 2012).<sup>76</sup>

The oil companies are planning to increase the Brazilian oil production to 6 Mb/d by 2020 while the Brazilian oil consumption is estimated to reach roughly 3 Mb/d (EPE, 2011). These figures indicate that Brazil should overtake the Venezuelan position as the largest regional oil exporter in a few more years. This substantial increase in oil exports opens a large window of opportunities for cooperation between the Brazilian oil industry and the oil importers countries.

Petrobras will invest US\$ 236.5 billion in the period 2102-2016 (Petrobras, 2012) and the IOCs another US\$ 50 billion. However, the country is short of industrial, technological and financial capacity to sustain this investment program (de Oliveira, 2008). Many suppliers of equipments and services for the oil industry are taking advantage of the scale of the Brazilian oil development to establish local activities. The technological learning acquired in the Brazilian pre-salt will be strategically used in their activities elsewhere, especially in the African West Coast.<sup>77</sup>

So far, oil exports from South America to Asia have been limited (Figure 1). Recently China offered a US\$ 10 billion loan to Petrobras in exchange of long term contract for oil imports.<sup>78</sup> The agreement specifies that 30% of these financial resources will be used to buy oil equipment in China and for Sinopec to purchase the transportation of Brazilian oil to China (Estado de São Paulo, 27/5/2010). Moreover, Sinochem and Sinopec have both acquired participation in oil blocks.

The Brazilian position in the oil trade will become increasingly relevant when the economic crisis recedes and the climate change issue returns to the international political agenda. This is a complex issue, full of uncertainties but the world needs to develop a low carbon, reliable energy system to satisfy the needs of a growing population that should reach 9 billion people by 2050. Brazil is in a privileged position to take a leading, constructive role on this issue, especially in South America

The country's energy system is largely organized around renewable energy sources and it can use its large hydropower reservoirs to support the spread of renewable energy sources in its

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<sup>75</sup> The pre-salt area of these two basins has the same size of the sedimentary basin of the Mexican Gulf.

<sup>76</sup> The Campos and Santos basin are a fraction of the Brazilian sedimentary basins, most of it underexplored so far.

<sup>77</sup> The geology in the West African continental platform is similar to the Brazilian one.

<sup>78</sup> In 2012, 180 thousands b/d are being exported to China.

neighboring countries (de Oliveira, 2006). Moreover, Brazil can offer a secure supply of hydrocarbons to the global energy market, reducing the oil price volatility. Deforestation, a major problem in the past, was drastically reduced, and the increasing agrobusiness productivity led Brazil to the position of large supplier of food to the global market.

With the re-establishment of democratic governments, South America poses no relevant threat to international security agenda. The region is a nuclear weapons-free region and there are no violent conflicts. The problems of external debt and the spiraling inflation rate are past. There is some concern with the spreading of populist, nationalist regimes in some countries but the Brazilian authorities have actively used the country's tradition as a trouble shooter to alleviate these problems<sup>79</sup>. Eventually, the Brazilian leadership in the region should remove the existing restrictions for the IOCs access to the regional oil resources.

## 6. Conclusion

Oil will remain at the core of the global energy system in the near future but this is an unsustainable situation. Oil is a fossil resource, major source of green house gases. The transition from oil to alternative energy sources was slowed down by the economic crisis but it will speed up after the global economy recover.

The shift of the oil demand to the emerging countries created a new context for the global oil consumption. Linked to the restrictions for the access of the oil resources of oil exporting countries, this new context induced the oil price to a new level, and made it extremely volatile. This situation is damaging for the world economy. New sources of reliable oil resources, accessible to the IOCs, are indispensable for the stabilization of the oil price at a predictable level.

Our paper suggests that South America will have a relevant role in this process. The region is a growing exporter of liquid fuels (conventional and non conventional). The Brazilian tradition of trouble shooter places the country favorably to organize the participation of the region in the orderly global transition from fossil fuels to alternative sources of energy. The region main weaknesses are the shortage of capital and its limited technological expertise to develop its energy resources. This situation offers large room for the establishment of international cooperation agreements with oil importing countries.

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<sup>79</sup> A troubleshooter country can be identified by the way it pursue three objectives whenever it faces a problem with international impact: i) to contain the conflict, preventing it from expanding into new, violent clashes; ii) to circumscribe the conflict, so as to prevent it from spreading to other countries; iii) to reverse the crisis so that the relations between the parties, domestic or otherwise, return to normal.

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## Session 3

# Green Growth and Sustainable Development



### Presentation 3

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Professor Lee, Jisoon, a Korean, is currently teaching at the Seoul National University. He studied at the University of Chicago, and before coming to SNU, he taught at Brown University.

Professor Lee's research interests are economic growth and development, money and finance, and environment and resources.

His works in recent years are mostly on Green Growth. In 2010 he published a book titled *Green Growth: Korean Initiatives for Green Civilization*, Random House. In the book Professor Lee shows that it is entirely possible to achieve the three goals of economic, social, and environmental development. This conclusion is based on a theoretical model he proposes in the book. Professor Lee also suggests many interesting policy options for socially inclusive sustainable green growth. In 2010, he led a team of researchers, whose efforts were published as *Green Growth Forum 2010, Series 1 to 4*. The Series 1 titled *Green Growth: Issues & Policies* is edited by Professor Lee. (He has contributed a chapter, too.) In 2011, he led another team of researchers, whose efforts were published as *Green Growth Forum 2011, Series 1 to 5*. Again the Series 1 titled *Green Growth: Policy Options* is edited by Professor Lee. (He has contributed a chapter, too.)

Professor Lee wrote the following papers in 2011. Two related papers, "Green Growth: A New Paradigm for Korea," and "Sustainable & Inclusive Green Growth for All," were published as journal articles in *The Korean Economic Forum*, Volume 4, No. 2 & 4. Three papers, "How to cope with the sudden collapse of North Korea", "A New Assessment of J. M. Keynes' General

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Theory,' and "Economic Strategies for Sustainable Development with a Particular Attention to Future Generations" were published as book chapters.

Professor Lee has served as the Head, School of Economics, Seoul National University. He was the founding Co-editor and Editor of the Seoul Journal of Economics. he is the Head of the SNU Institute for Research in Finance & Economics.

Professor Lee was former President of the Korea Econometric Society and the Korea Money and Finance Association. Prior to embarking on academic career, Professor Lee had also worked for the Bank of Korea.

For development related works, Professor Lee had served as (in-residence) consultant for the World Bank Institute for 2.5 years. He had also been a Senior Visiting Fellow at the Asia Development Institute based in Tokyo. Professor is currently a civilian member of the Presidential Committee on Green Growth.

## G20 and global green growth financing

Green growth, which aims to achieve development in the environmental/resource as well as economic spheres, is steadily gaining momentum in many countries. Admittedly, there still exist some doubts and not everyone is enthusiastic. Nevertheless, the majority take it as a very effective path to achieve harmonious and sustainable development. The G20 countries took it wholeheartedly as its own agenda when green growth initiatives were first proposed in the 2010 Seoul G20 Meeting. The 2011 and 2012 G20 Meetings have reaffirmed their commitment to global green growth. That the OECD in 2011 took green growth as its own core agenda for development cooperation was a turning point<sup>80</sup>. World Bank is also devoting a great deal of efforts to green growth with its inclusive green growth agenda. Green growth can also be a useful vehicle for fulfilling the UN's green economy initiatives.

The goals of green growth cannot be achieved satisfactorily, if everything is left to free market competition. This is because most of the tasks that green growth initiatives must deal with are subject to free riding problems, tragedy of commons problems, or asymmetry of information problems. Most of the initiatives are also subject to economies of scale problems or coordination failure problems. These problems, if not properly addressed, are known to lead to sub-optimal resource allocations.

The inadequacy of market based solutions is frequently cited as reasons why a government must step in. It is true that, to a certain extent, the problems can be dealt with by governmental actions. By altering the incentive system under which citizens make choices, a government can influence citizens, inducing them to make better choices. With regard to green growth, utilizing a combination of fiscal, financial, and regulatory measures, the government can encourage citizens to take actions that are compatible with green growth, and at the same time not to take actions that are detrimental to green growth.

One important such tool is the financial policies. In order to better achieve the goals of green growth, a society should be able to allocate more resources to activities that are conducive to green growth and less to activities that are detrimental to green growth. When financial transactions are performed with the above in mind, we call it green growth banking or green growth finance.<sup>81</sup> Here, by setting up needed soft infrastructure, by assisting private financial institutions' voluntary efforts, and through direct or indirect engagements, a government can promote the green growth finance. That

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<sup>80</sup> See OECD(2011), Towards Green Growth.

<sup>81</sup> We differentiate green growth finance from green finance. Whereas the latter focuses on green issues alone, the former is concerned with growth and green issues together.



is, a government can help the society to allocate more funds in the right places, and thereby promote green growth.

At present, the green growth finance is at an earlier stage of development and it is riddled with difficulties. The development records of green growth finance are quite uneven across countries. Even in the G20 countries, only a few Western European countries such as Denmark and Netherland show some progresses in green growth finance. In East Asia, both South Korea and Japan show modest progresses. When it comes to the non-G20 countries, the poor countries in particular, the green growth finance is grossly underdeveloped. As their overall economy and with it their conventional finance are under developed, it is no wonder that their green growth finance is not developed at all.

Is this lack of progress in the green growth finance a problem? I think it is a serious problem. It is because the tenets of green growth are very important: The sustainability of the human civilization seems to be dependent on whether we can achieve economic, social, environmental, and resource sustainability. Furthermore, the natural environment and resources of the earth are global public goods and/or global commons. As such they must be properly protected and preserved so that they can continue to be bases for human livelihood. However, the protection of the natural environment and the preservation of natural resources, though they are important on their own, should not be excuses for economic backwardness. Humanities need economic progresses, too. Apparently both growth and green are important. That is why the global green growth is crucial, and that is why I regard the advancement of the global green growth finance is important.

Most of the G20 countries seem to be able to handle most of the green growth finance issues for themselves. They have resources and knowhow to implement necessary measures. But at present they seem to lack strong willingness. But for most of the non-G20 countries, the poor countries in particular, the green growth finance is very far from reality. They seem to have neither willingness nor capacity to engage in the green growth finance. Therefore, if left alone, green growth would not occur in these countries as satisfactorily as we want. Here the G20 countries can assist the developing countries so that they would pursue the green growth initiatives more actively.

How can the G20 countries help the poor countries so that the latter can pursue their green growth strategies more effectively and actively?

Making the development paths of the G20 countries firmly anchored to green growth should be a first step. If the G20 countries continue to follow the conventional growth paths that rely too much on fossil fuels and that are detrimental to natural environment, they cannot persuade other countries to adopt the green growth paths. In terms of finance, then, they must first transform their finance so that it would be conducive for green growth. When the green growth finance is firmly established in the G20 countries, it would be easier and much more effective for them to propagate it to the developing countries.

There are many ways for the G20 countries to assist developing countries with green growth finance. Transforming their ODA to be conducive for green growth would be an important step. According to OECD, her member countries are offering some \$130 billion a year as ODA. Out of this about \$25 billion is focused for green growth. There is a room to make the ODA green or greener. In addition, since the ODA amount is only 0.32% of the aid giving countries' GNI, there seems to be a room for ODA expansion. The multilateral institutions including the World Bank can also do more for green growth finance. It is encouraging to observe that the World Bank has already begun to change her lending practices from brown to green.

The private sector can do more in the area of global green growth finance, too. An OECD report<sup>82</sup> notes that the pension fund managers of the rich countries are actively seeking ways to move into green growth financing in developing countries. This may be the same with other global financial players, including the sovereign funds. It would be even more important for the global financial players to abstain from financial practices that can be detrimental to the natural environment and/or that might encourage misuses of natural resources. Some financial players have been blamed for their (mostly inadvertent) involvement with global pollution or waste dumping projects. Most of the infrastructure built in the past in developing countries with monies from aid agencies and global financial players are mostly 'very brown' in that either they are detrimental to local natural environment or they were built with environmentally harmful materials and/or energy inefficient materials. Many of the huge infrastructure projects which turned out to be economic failures are sheer wastes: they are definitely not green.

Of course, mobilizing and allocating funds more to the developing countries in order to assist them to pursue the green growth projects is only a first step in the right direction. When the developing countries do not have adequate capacity to pull off green growth, offering money will not do much. (It may even encourage them to take wrong kinds of actions.) Hence it is critical to build up local capacities. When the local financial systems are not working efficiently, assisting them to make their financial systems work better should be a first task. Multilateral aid agencies and the global financial players can do much more in the area of capacity building.

### **1. Global green growth**

Global green growth is a means to achieve sustainable development so that all people of all generations can sustain decent life on the earth. Green growth, when it was launched as an innovative national agenda for S. Korea in 2008, its main focus was to achieve economic as well as environmental/resource sustainability. However, green growth now seeks to pursue social sustainability, too. We recognize that achieving sustainability in economic, social, environmental, and

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<sup>82</sup> Croce et. al.(2011). "The role of pension funds in financing green growth initiatives," *OECD Working Paper* No. 19.

resource spheres all at the same time is important. It is the right direction we must take to make the world a place where all people of all generations can sustain decent life amid harmonious co-existence with the nature.

The current state of the world is very far from the ideal. There are at least four serious problems that we must urgently deal with.

First, there are the prevalence of poverty and widening income gap. Too many people suffer from extreme poverty. According to a World Bank study, some 2.4 billion people live in 2008 with \$2 or less a day.<sup>83</sup> This is a far cry from the prosperity that many in the rich countries enjoy. The latter's daily living expenses are \$100 or more, which amounts to more than \$35,000 per capita income. The prevalence of poverty and the widening income gap are problems we must deal with.

Second, the earth's natural environment has been exploited too much, perhaps beyond repair. There are growing signs in many parts of the world that their natural environment is losing its regenerating power and as a result its carrying capacity is rapidly dwindling.

Third, there are serious indications that we human beings use up too much natural resources. As a consequence, some important natural resources may run out before long, making our descendants' life inferior to that we enjoy now. Extinction of species and weakening bio-diversity are problematic, too.

Fourth, greenhouse gases are rapidly accumulating in the atmosphere. Many scholars believe this to be the main cause for global warming that has been intensifying in the last decades. The global trend of the earth getting warmer is regarded by most people as the main cause for weather related disasters. Unless we can stop the global warming trend, they argue, our future would be very dim.

We have gotten these problems basically because we have mismanaged the earth's environmental (natural) assets and also because we have mismanaged the economic development processes. The problems will surely get worse, if we do not take appropriate actions now. All countries would be adversely affected by them, but the poor would bear a much larger share of the burdens. This strongly suggests an urgent need for a fundamental change in the ways how we live. We have for a long time neglected the environmental as well as social aspects of development, paying too much attention to the narrowly defined economic aspect.

In order to deal with the problems, we can try to achieve social, environmental, and natural resource sustainability as well as economic development. For poverty eradication and quality of life improvement, we should sustain economic growth. Economic development is a must for the poor countries in the world. In order to make economic development more equitable and inclusive, we must pay attention to the social aspects of development. The widening income gap between the poor and the rich, if left unaltered, could become a source for global instability.

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<sup>83</sup> See, World Bank, Development Research Group's estimate made in 2012.

In order to strengthen the environmental sustainability, we would better stop destroying and improve our records of mismanaging the environment. Quality of air, water, and soil in many parts of the world is very bad. Many in the world suffer from the lack of clean water and destruction of natural habitats. Loss of bio-diversity, destruction of forest, and desertification are threatening the livelihood of many people. And the global warming is getting ever more serious. In order to strengthen the natural resource sustainability, we should find ways to preserve resources. For example, we can find ways to use resources less, use them more efficiently, re-use or recycle wastes, and come up with alternatives.

The green growth initiatives are action programs to achieve the above mentioned economic, social, environmental, and resource wise development all at the same time. The green growth is a growth whose processes and outcome are green. At the same time it is a growth powered by green activities. Here by green we mean the followings: Less environmental degradation and better environmental protection, less pollution and better cleanup, reduction in waste disposal and recycling of wastes, better use and conservation of resources, and developing alternatives to conventional energy sources.

OECD concurs that green growth can substantially contribute to humanities. It notes that if countries can improve the resource management practices, resource productivity can be boosted a great deal. This would make global resource problems less acute. OECD also notes that green growth is an effective means to encourage economic activities to take place where it is of best advantage to humanities over the long run. OECD emphasizes innovation, finding new ways to solve our problems, as the most important component of green growth. OECD also notes that green growth is a means to recognize the full value of natural capital as input as well as objects for final use, thereby encouraging people to manage natural capital in the best way possible way.

What can green growth do for the poor in the world? Well managed green growth can offer substantial benefits for the poor. There would be economic, environmental, and social benefits.

For economic benefits, green growth is a means to raise GDP and to shift its composition from brown to green. The increase in income, hence an increase in employment and the better mix of products will certainly enhance the quality of life of citizens. The poor can derive additional income if green growth is designed to pay for ecosystem services the poor perform. For example, when farmers, by keeping their lands unspoiled or un-eroded, contribute toward environmental values for the society, they can be paid for their services. By promoting diversification green growth can help the poor, too: Risks faced by the poor will get smaller and managed better. Green growth will also offer opportunities for the poor to learn and innovate. The spirit of ‘standing alone’ or self-help is the most important personal trait for the poor to overcome poverty.<sup>84</sup>

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<sup>84</sup> In S. Korea’s development, the Saemaul Undong (New Village Movement), which instilled the spirit of self-help, standing alone, and hard-working, had been very effective to transform the farmers. See <http://www.saemaul.or.kr>.

For environmental benefits, by promoting better use of natural resources and better management of natural resource endowments, green growth will offer substantial benefits for the poor countries. Green growth can contribute toward a reduction of the adverse environmental impacts that the poor face. By preventing environmental degradation, green growth can offer benefits, too: Currently some 21 developing countries lose annually about 8% of their GDP due to environmental degradation. When this is reversed, then, the benefits can be substantial.

For social benefits, the improvement in the quality of life that green growth will bring is most important. Green growth can help the poor by creating decent environment related jobs. It can also be a means to enhance social, human, and knowledge capital of a country. The inclusive green growth will contribute toward the reduction in inequality.

Needless to say, these benefits for the poor do not accrue automatically. The poor and poor countries would enjoy the benefits of green growth only when the green growth initiatives are carefully designed and implemented.

## **2. Global green growth and finance**

### **(1) Finance**

Finance plays a key role in resource allocation. Its primary task is to intermediate resource allocations in a most efficient manner. Finance plays this role for a country, a region, or a group of countries. Finance occurs in cycles. The following is a typical example.

First, ample resources should be mobilized from savers. For this financial institutions or markets offer numerous financial products to the surplus units. Deposit instruments of banks and stocks & bonds on the securities market are such examples.

Second, financial institutes or markets then repackage the mobilized resources so that they become more suitable for borrowers or deficit units. For example, banks can transform short term savings into long term lending instruments.

Third, the actual funding process occurs. For this financial institutes or markets must evaluate and screen the loan applicants. They must screen out the best borrowers or the most worthy investment projects. When the screening is over, then financial institutes or markets actually allocate funds to the selected investment projects. The investment projects would then get going.

Fourth, financial institutions or markets assume the role of monitors and/or governors. There is no guarantee that all the funded projects would succeed and some are liable to fail. In order to prevent malfeasance on the part of borrowers, they should be closely monitored. When irregularities and misdeeds occur or are liable to happen, they should be corrected and prevented through appropriate governing actions.

Fifth, when time comes, the financial institutes or markets must recoup principals and returns

from the borrowers. As some of the funded project would fail, lenders could not recoup all the loans.

Sixth, with the recouped principals and yields, banks or markets would pay back the original lenders, i.e., savers. When the savers get appropriate returns, they would be satisfied. Financial institutes or market participants would also earn appropriate returns from the series of transactions.

Seventh, financial institutes and markets also play the role of managing risks for borrowers and lenders.

The most essential function of finance for economic growth is to link savings and investment. For economic growth, a sufficient amount of investment should be made. For example, S. Korea currently invests in physical and human capital respectively about 29% and 10% of her GDP. This huge amount of investment has been possible largely thanks to the good functioning financial industry. What is more important is to allocate the funds in the right places. That is, the quality of investment is important, too. Preventing wrong investments, over investments, and sheer wastes is an important function the financial industry should perform.

## **(2) Green growth finance & global green growth finance**

Green growth finance is finance specialized for green growth. We regard finance that promotes activities conducive for green growth and discourages activities harmful for green growth as green growth finance. The objective of green growth finance is to allocate funds so that (i) brown activities can be more effectively transformed into green activities, (ii) green activities can be made greener, (iii) fresh new green activities can get started, (iv) the growth potential of the economy can get strengthened, and (v) the society can get more inclusive.

The motto should be ‘proper amount of funds in the right places’. Of course, this should be a motto for any kind of finance. For green growth, the key lies in what we mean by the words ‘in the right places.’ The right places mean all the activities that would contribute toward the twin goals of grown and green. By the same token the wrong places mean all those activities that would harm either of the goals, green or growth.

What do we mean by global green growth finance? It is finance that would promote green growth all over the world. In particular it means green growth finance being practiced in the non-G20 as well as in the G20 countries. Green growth related finance occurring between the non-G20 and the G20 countries is also an important component of global green growth.

Global green growth finance is important, because green growth is crucial for all countries and because green growth is concerned with global public goods/commons. The global public goods cannot be adequately supplied and the global commons cannot be well managed, unless globally concerted efforts of all countries are mobilized. And global green growth finance, by promoting the global efforts to protect the global public goods and enhance the global commons, will greatly help

global green growth to smoothly proceed.

Global green growth finance is especially meaningful as means to assist green growth in the developing countries. As we have pointed out in the above, the developing countries have greater needs to adopt the green growth strategies. Yet, their capacity for it is grossly inadequate. They lack needed institutional set up, financial resources, manpower, knowhow, and technology. What is more, they seem to lack strong desires to go for green growth. This suggests that the G20 countries should be able to assist the developing countries' efforts to implement the green growth initiatives.

One of the most effective means for assistance is financial assistance. If the G20 countries and their financial institutions can offer meaningful help to the developing countries, the latter would be able to implement green growth initiatives better. When, with the help of the G20 countries, more financial resources are flown into the right places of the developing countries, more efficiently working financial systems are established, stronger finance related capacities are built, and advanced finance related knowhow and technics are transferred, the developing countries would be able to implement green growth initiatives much more actively and effectively. This is the role that the global green growth finance can play.

According to the European Climate Foundation<sup>85</sup>, the social overhead capital investment requirements of the world are about \$7 trillion per year till 2020. Of these the energy related investment needs are \$1.5 trillion per year. The low carbon investment needs to meet the less than 2 degree Celsius target are estimated as \$200 billion per year. This is a huge amount. Of those, the incremental cost financing needs are \$80 billion. That is, the world should be able to come up with this much additional financial resources.

World Bank estimates that the developing countries would need \$140 ~\$175 billion per year for green growth related investment. This amounts to about 1/2 per cent of those countries' GDP. The East Asia region alone needs some \$80 billion per year. This appears huge. However, World Bank points out that the countries in the region already spend some \$70 billion per year as fossil fuel subsidy. Therefore a fair amount of the investment needs could be met if the countries can reform the fossil fuel subsidy policies.<sup>86</sup>

### **(3) Green growth finance is difficult**

Green growth finance is marred with difficulties. That is why it is not adequately developed even in the G20 countries. There are several reasons why this might be so.

Green growth related investment projects are not easy to identify. As yet those in the financial communities do not have effective means to clearly identify what are 'green' or 'green

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<sup>85</sup> European Climate Foundation (2010), "From Climate Finance to Financing Green Growth."

<sup>86</sup> World Bank (2012), Inclusive Green Growth.

growth' activities. Neither have they adequate means to ascertain how green such activities are. And there exists severe asymmetry of information in green growth related projects. The asymmetry is very difficult to deal with.

Most of the green growth related investment projects are highly risky and require long gestation periods. Although most of them require substantial amount of up front investments, the rates of return on those projects are frequently estimated to be lower than those of 'brown' investment projects, at least in the short run. One of the key reasons why the green projects have lower rates of return is the widespread practice of underpricing the environmental goods and services including natural resources. What is more, the CEOs of the firms that should engage in green growth related projects have very short time horizons. They are very hesitant to commit themselves to risky long term projects. That is why even in the G20 countries green growth finance is not as active as desired. What is more, most financial institutions do not have adequate manpower to handle green growth related businesses. Here it appears that the venture capitalists should assume more active roles in green growth finance. As yet, they are not active.

#### **(4) It is even more difficult for developing countries**

The rich countries and their larger firms can deal with the above difficulties without great difficulties. In time they will find ways to overcome the difficulties. However, the poor countries and small & medium sized firms of the rich countries do not have adequate capacities to deal with those difficulties. Beside the deficiency in capacity, the poor countries have other problems, too. Most of all, they often have different priorities. They think growth is more important than environmental protection and resource conservation. Income and jobs appear important, but environmental goods/services are less appealing to them. Hence they tend to undervalue the environmental goods or resource conservation. 'Grow first and clean up later' seems to be their motto.

Nevertheless, the needs to deal with environmental and/or resource management issues appear to be greater for developing countries. Most developing countries mismanage their environmental/natural assets. For example, they suffer from the lack of safe foodstuffs and clean water, inadequacy of sanitation services, and severe indoor pollution caused by heating and cooking. There are evidences that they grossly mismanage their mineral, forest, and fish resources. This trend should better be reversed.

Many developing countries are too dependent on natural resources to be immune from volatilities in the world resource markets. As they are unprepared, they are vulnerable to environmental/natural disasters, too. Besides, they are burdened with severe inequality in income, assets, and knowledge. There also exist serious disparities between gender and among races. The fact that they would become serious emitters of greenhouse gases once they begin to grow indicates the urgency of addressing the issues.



Even when the developing countries are willing to undertake green growth initiatives, they lack funds, knowhow and technology, expertise, and institutional setups. Their fear for the possibility of rich countries using the green issues as a disguise for protectionism, dumping pollution on them, and unfairly exploiting their natural resources also acts as a deterrent. Consequently the poor countries tend to be very hesitant to undertake the green growth initiatives.

### **3. Can the G20 countries do something about it?**

#### **(1) Why should the G20 care?**

The first set of reasons why the G20 countries ought to care for developing countries' green growth is the same as why they offer aids. The G20 countries offer aids because it is a right thing to do. It helps improve the global stability and peace. It is also a way of readdressing past wrongs of the some of the G20 countries. Besides, the G20 countries can afford to give assistance to the developing countries. They have expertise, knowhow, and financial resources. It might offer the aid giving G20 countries opportunities to enhance ties with the developing countries. Aids for the poor countries, when effective, might reduce the pressure for the poor to migrate to aids giving rich countries, too.

The second set of reasons appears to be as important as the first. Environmental goods/services are public in nature. That is, they are important constituents of the global public goods. In addition most of the earth's natural resources are a part of the global commons. The benefits of enhancing the values of the global public goods and better managing the global commons accrue to citizens of all countries. Yet, the rich countries tend to get more benefits. By the same token, when the global public goods are degraded and/or the global commons are mismanaged, their ill effects tend to fall more on the poor of the poor countries. Hence there is a strong need for the rich countries to assume a larger share of the costs associated with the protection of the global public goods/commons.

Environmental disasters occurring in the poor countries would hurt the rich countries, too. Assisting the poor countries in their efforts to mitigate such disasters would offer benefits to the rich countries. Most of all the rich countries are more responsible for environmental degradation, resource depletion, and greenhouse gases. They use up much more resources than others and they emit more greenhouse gases than others. Frequently major environmental disasters occur in the rich countries, too. All these strongly indicate that the G20 countries should do much more for global green growth.

#### **(2) G20 can be a role model in green growth for developing countries**

The G20 should do more for green growth to proceed vigorously in their own countries. Their economies are still very 'brown' in that they depend too much on fossil fuels, consuming a large amount and at the same time emitting a large amount of greenhouse gases. They need to turn their

economies into 'green'. That is, green growth is important for the G20 countries, too.

If the G20 is to assist the developing countries' efforts to implement green growth initiatives, the G20 would better anchor the green growth initiatives firmly in their development strategy. Offering aids or entering into development cooperation in activities that the aids giving countries themselves are hesitant to implement would not be effective.

The G20 countries can promote green growth related activities by making such activities less risky and more profitable. More financial resources would then flow into the green growth related activities. Imposing taxes on activities that are detrimental to green growth and offering subsidies for activities that are conducive for green growth is one such way. The public procurements of the green goods/services are also a very effective means. Regarding this, it is better to overhaul the entire public finance system so that it would be more compatible with green growth. For example, the greening of the existing government spending programs would act as an effective signal for others to follow. For a country like S. Korea, who spends a lot for national defense, greening the military can be very important. And there are ample rooms for the social infrastructure investments to be made green. Indeed, every aspect of government spending can be made green: Housing, health, education, and welfare programs are candidates.

As we have pointed out before, green growth finance is marred with many difficulties. The G20 countries should be able to address these problems. By setting up soft infrastructure of the country appropriate for green growth, by utilizing the public banks, by utilizing policy lending administered by private banks, and by undertaking some of the pilot projects, governments in the G20 countries can do a lot to promote green growth finance. Among the soft infrastructure to build up, rules for green finance, markets for green financial products, green credit evaluation companies, green guaranteeing companies, and green criteria and certificates appear to be essential. Since many of the green growth related activities have characteristics suitable for venture capital, fostering venture capitalist can also be important.

The most important reason why green growth is not as active as desired is the price distortions widely present in the G20 countries. Currently, the environmental goods and key natural resources are priced way below their social marginal cost. In many countries, the relevant user fees are lower even than their private marginal cost. Price controls, special favors, and harmful subsidies all contribute toward the price distortions. It is very difficult to correct the price distortions. Nevertheless, unless these distortions are corrected, green growth hence green growth finance would never occur satisfactorily. The G20 countries should take a lead in correcting the situation.

### **(3) How can the G20 help promote green growth in the poor countries?**

#### **A. Offering more and better financial assistance**

The G20 countries can assist the developing countries' efforts to implement green growth initiatives by offering more and better financial help. There are several ways to offer more financial help.

One important channel with which the G20 countries can offer financial assistance is to transform their current ODA into green growth oriented ODA. The net ODA of the aids giving countries currently amounts to some \$129 billion, which is about 0.32% of the aids giving countries' GNI. Of these about 71% is bilateral aids.<sup>87</sup> This existing ODA can be reoriented so that it may help green growth in the developing countries. For example, when the G20 offers help to the aids receiving country in the form of building a new highway, it can promote green growth in the receiving country, if the said highway is built with green materials in less environmentally harmful resource conserving methods.

Another channel is to substantially increase the ODA amount. The current 0.32% of aids giving countries' GNI seems to be too little. If it can be raised, for example, to 1% level, total ODA can be increased to \$400 billion, a net increase of \$260 billion. It is indeed a sharp increase.

But better is as important as more in the case of green growth finance for the developing countries. The key here is to insure the available financial resources to get allocated to the right projects. As most of the developing countries do not have adequate capacity to efficiently allocate funds, the G20 countries together with their financial institutions should offer aids in the form of knowledge transfer and sharing. Here the motto should be 'encourage the developing countries to do more in pro-green growth activities and discourage them to undertake activities that are detrimental to green growth'.

There are at least two important additional sources for financial resources for the developing countries. One is the various funds of the rich countries. According to an OECD estimate, there are about \$528 trillion in pension funds, \$523 trillion in mutual funds, and \$520 trillion in insurance funds. Thus the three together have some \$1,570 worth of funds. Many managers of those funds are willing to move into the developing countries. If there are green growth related projects with expected rates of return not too far below the average, the above mentioned funds are willing to move into global green growth financing. The managers of those funds regard such financial transactions as important elements of their socially responsible behaviors.

## **B. Improving the practices of global financial communities**

Currently numerous global financial players are engaged in global finance. If these financial players can be persuaded to go green, hence become global green growth finance companies, we can jump start global green growth finance without much difficulties.

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<sup>87</sup> OECD (2012), Aid in Support of Environment.

Because of the public goods aspects and the possibility of coordination failure, it is a good idea for the global financial players to uphold mutually agreed principles or norms of global financing. The UN PRI (principles for responsible investment) and the Equator Principles are two such examples. These enumerate what to do and what not to do in order to practice socially responsible and environmentally sound financial transactions. One important activity that no banks are allowed to engage in is assisting the export of pollution from the rich to the poor countries.

The global financial players frequently go into the developing countries in alliance with local counterparts. In most cases the local counterparts do not have adequate capacity to undertake green growth finance. The global players should be able to help the local ones by transferring and sharing their knowhow, expertise, and experience. Greening the entire process of lending business of the local counterparts is a worthwhile undertaking. There are also great needs for the local counterparts to transform themselves into green financial institutions. In terms of energy consumption, use of papers, and use of potentially toxic materials, most local financial institutions are far from green. Hence helping the financial industry to be reborn as a green industry is a worthwhile project.

The G20 countries can also help the developing countries in transforming their public finance into green ones. When they offer financial assistance, they may require the developing countries to overhaul their public finance so that they may be more conducive for green growth.

The carbon financing currently being developed in the G20 countries has a potential to become an important instrument for helping the developing countries. For example, when the carbon financing becomes active, many companies in the G20 countries might undertake, in the developing countries, an ever increasing number of investment projects that would offer carbon credits to them. POSCO, a South Korean integrated steel mill corporation of the world class, engaging in forestry business in Indonesia is an example.

### **C. Multilateral agencies can play important roles**

OECD, World Bank, and the regional multilateral banks including ADB, AfDB, and IDB are currently playing very important roles in development cooperation. Most of all they disburse a large amount of financial resources to the developing countries through various projects. They also place major roles in capacity building and/or knowledge sharing. Up until 80s these multilateral institutes did not pay sufficient attention to environment and resource related issues. In recent years they have begun to focus more on those issues. It is encouraging then to observe their environment/resource related departments are becoming more influential. Yet, their efforts are yet rather meager in that, of their vast manpower and financial resources, only a small portion is devoted to environmental/resource issues. If the entire businesses of these multilateral institutions are to be transformed to genuinely green ones, the implication for global green growth would be really huge.

#### **D. The Green Climate Fund**

In this regard, the Green Climate Fund, which is launched recently, can assume important roles. By specializing in green growth finance, it can be a role model for other multilaterals. The Fund was setup with the global climate issues in mind. This seems to be a too narrowly defined objective. It will be much more effective, if its objectives are enlarged to global green growth issues. Needless to say, growth is very important for the developing countries. Of course, environment and resource issues are important, too. Therefore, promoting environmentally sound and resource wise growth strategies should be the priority for the newly established fund.

#### **E. Capacity building**

Of those the G20 countries might help the developing countries, perhaps the various development cooperation initiatives to strengthen their capacities is most important. Thing will not change, unless people change. It is the same with green growth. Unless the top leaders, policy makers, bureaucrats, and other opinion leaders change their minds and take the green growth initiatives as their own agenda, green growth will not proceed smoothly in most of the developing countries.

The policy makers are particularly important. They play predominant roles in the society, they handle a large amount of resources, and they are very influential on the private sector. This is more so in financial matters, since most the financial industries of the developing countries are in most cases tightly controlled by policy makers. Hence it is very important to convert the policy makers.<sup>88</sup>

In the long run, however, there are limits to what policy makers can do. As economy develops, ordinary citizens will become more powerful. Therefore, it is crucial to educate not only the policy making elites, but also ordinary citizens. The children education is most important in this regard. They will become the backbone of the society. In cooperation with the teachers of the developing countries, the G20 can promote green growth related education.

When it comes to capacity building, what to build is as important as why or how to build. Here it appears that instilling the basic principles should be a priority. The basic principles of economics, for example, are applicable not only to the rich countries, but also equally to the developing countries. For example, nothing is free and we should be prepared to pay for precious things is an important principle to uphold. The importance of hard and honest work, thriftiness, and future oriented mindset should be deeply instilled. A slight bias toward openness and economic freedom appears to help development.

For developing countries, improving basic health and sanitation facilities, providing citizens

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<sup>88</sup> GGGI in alliance with the Korea Environment Institute is currently very active in knowledge sharing activities. Workshops for policy makers were held in Hanoi, Da Nang, and Kunming.

with clean potable water, improving irrigation for farmers, reducing wastes, and cleaning up of the indoor pollution due to cooking and heating could be more important than developing fancier things in imitation of the rich countries. In this regard, the technological appropriateness is an important issue. Sharing and transferring knowhow, expertise, and technology that are compatible with local conditions is more important than transferring or sharing the advanced but improper technologies. It is important to tailor-make them so that they become compatible to local needs and capacity, before the G20 countries try to share or transfer their knowhow and technologies.

#### **4. Concluding thoughts**

This paper attempts to deal with the following issues. (1) Green growth, which aims to achieve the twin goals of growth and green at the same time, is a worthwhile task. The spirit of growth and green is much more positive and ambitious than the spirit of either growth or green. (2) Green growth is valuable not only for the rich countries, but also for the poor countries. That is, green growth should be a program for all countries. That is why we emphasize the global green growth. (3) The poor countries have greater needs to undertake the green growth initiatives. Yet, they are ill prepared for it. Frequently they have neither willingness nor capacity to do so. (4) Green growth would proceed most smoothly when the society is able to channel more financial resources into activities that are conducive for green growth and fewer resources into activities that are detrimental to green growth. (5) It is the essential role of finance to help allocate resources in the most efficient manner. When finance is geared for green growth, we call it green growth finance. And when it is geared to global green growth, we call it global green growth finance. (5) Currently green growth finance is marred with many difficulties. The global green growth finance is even more so. The difficulties can be dealt with to certain extents with appropriate policy interventions, at least in some of the G20 countries. However, the poor countries do not have capacities to handle the issue for themselves. (6) Can the G20 countries do something about it? Should they do so? I think the answers should be positive ones for both of the questions. (8) The G20 countries should be able to transform their own financial industries so that they undertake green growth finance more actively and effectively. (9) The G20 countries should also be able to help the developing countries' efforts to implement green growth initiatives. (10) G20 can do this by transforming their existing ODA programs, by increasing financial resources available for ODA, by redirecting the practices of the multinational agencies such as World Bank and OECD, and by encouraging private financial players to move into the developing countries more actively with pro-green growth financial services. The newly set up GCF and GGGI should play more active roles.

This paper touches upon only a small subset of problems: Too many important issues are left out. And some of the issues included for discussion are dealt with only cursorily. In the final version, some of these deficiencies must be addressed.

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## Session 3

# Green Growth and Sustainable Development



### Presentation 4

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Professor Sung Jin Kang has acquired his Ph.D. in Stanford University and he was an assistant professor at university of Tsukuba, Japan, between 1999 and 2003. He is currently a professor in Economics department and a director of Institute of Sustainable Development of Korea University in Seoul. He has filled various government posts in succession: he is currently a member of presidential council for future and vision, a member of policy consultant committee of ministry of education, science and technology, a member of policy consultant committee of ministry of unification, and a member of urban planning committee of Seoul, an advisor of national research council for economics, humanities and social science etc. He has recently published several articles on international and development economics field: "Foreign Direct Investment and De-industrialization," "Does Korea Follow Japan in Foreign Aid? Relationships between Aid and Foreign Investment," and "Green Growth and Korea Economy" Also, he has published several books this year such as "Green Growth ODA," which is a chapter of Green Growth: Global Cooperation, "The Linkage Impact of Foreign Direct Investment on Labor Productivity in Korea," which is a chapter of Foreign Direct Investment in Asia.



## Green Growth and Sustainable Development in G20: Performance and Prospects

### Summary

Since the Industrial Revolution, each country has largely relied on fossil fuel oriented industry and mass-production system for industrial and economic growth. Unfortunately, the eventual exhaustion of fossil fuel and global resource constraints impede the progress to sustain current economic growth strategy, and reckless use of fossil fuels has caused climate changes. Therefore, the fact that current economy system is highly dependent on fossil fuel and recent global financial crisis have made us consider adopting new economic growth strategy, which is green growth.

With ongoing international level of discussion on green growth, the terminology of 'Green Growth' has not been clearly defined yet. Also, governments and international organizations tend to confuse the definition of green growth, especially when it comes to using other similar terms such as eco-efficiency or green economy. Therefore, it is necessary to properly define green growth so that appropriate green growth policies will be designed and implemented to achieve the goal of sustainable development.

In terms of sustainable development, it contains detailed plans to promote economic and social development and eco-friendly activities simultaneously, however social development is relatively less considered than economic development and environment. Green growth policies for sustainable development not only contribute to environmentally friendly economic development but also indirectly alleviate absolute poverty simultaneously. However, it may cause social conflicts among interest groups. Therefore, it is required for government to establish and implement additional social safety nets in order to prevent such conflicts in advance.

This paper covers the following contents. Introduction will review background and objectives of green growth and sustainable development. As main parts, this paper explores the definition of green growth and sustainable development, main issues on green growth policy discussed in the G20 summit, policy directions of green growth, and prospects for sustainable development.

### 1 Introduction

Human beings were able to lead an unprecedentedly prosperous life owing to the fossil fuel oriented industry and mass-production system since the Industrial Revolution. However such conventional way of economic development encountered limitations such as lack of natural resources and environmental pollutions, which were the by-products of development. Now there is a compelling

need for the world to move away from the previous development paradigm and shift towards new schemes for sustainable development.

In particular, greenhouse gases emitted from economic development activities are accelerating global warming. Furthermore, climate change including the rise of sea levels and fluctuations in rainfall, caused by nature and human activity, is broadly affecting the entire world. Due to its externality, such global issues cannot be solved by a group of advanced countries or individual nations alone. Instead, every nation should cooperate and make a concerted effort.

Until now, major developed countries discussed and came up with ways to take action against climate change. For instance, the European Union unveiled the Energy and Climate Change Package in 2007 and the Climate Action and Renewable Energy Package in 2008. The United States enacted American Clean Energy and Security Act in 2009 while Japan revealed Green Economy and Social Change in 2009 and Basic Act on Global Warming Countermeasures in 2010. The Korean government also presented “Low Carbon, Green Growth” policies in 2008, garnering attention from the international society.

Population growth rate and the percentage of people living below poverty line are relatively greater in developing countries than in advanced countries. In this regard, sustainable development is essential for overcoming current poverty in developing countries. Nevertheless, some of the developing countries are not actively working with developed countries to tackle climate change because they have a relatively bigger appetite for promoting growth, rather than combating climate change. Therefore, in order to sustain development successfully, international cooperation is needed to share ideas between advanced and developing nations.

G20 Summit has offered various policies on such global agenda including environment and development. It was since the third G20 Summit in Pittsburgh that leaders began to discuss issues on energy, volatility of fossil fuel prices, and environment, going beyond climate change. At the latest meeting, held in Mexico in June 2012, there were discussions over establishing cooperative methods, such as inclusive green growth strategy, to enable developing nations to rightly pursue sustainable development. This meeting provided world leaders with an opportunity to re-affirm that international cooperation with developing nations to promote growth is a critical element in achieving sustainable development.

Despite such active debate in the international community, the term green growth has not been clearly defined yet. In fact, even government and international organizations are confused with words related to green growth such as green economy or eco-efficient economy. Therefore, in order to reach sustainable development through appropriate policies, it is necessary to define those terms more precisely.

Green growth is essential for achieving sustainable development; however, it is not sufficient. The aspect of social development has not been as much incorporated into green growth as economic

growth or environment problems. While green growth focuses on growth attained through strengthened market mechanisms and environmental issues, not enough attention is given to social development. To work toward an ultimate goal of sustainable development, economic growth, social development, and eco-friendly activities should be pursued all at the same time.

In order to sustain development successfully through green growth strategies, there is a compelling need for the G20 to examine the following policy directions. First, it is necessary to establish social safety net to reduce poverty. This is a social developmental aspect of green growth. Next, recognizing that international cooperation is a must, it is essential to set up an international network and efficient international governance. Lastly, the G20 needs to adjust price volatility in energy markets.

Thus, in this paper the following issues will be discussed. Following a brief introduction and background in Section 1, Section 2 defines green growth, sustainable development, and their relationship. This section explains that green growth is a very important tool for sustainable development and has mainly focused on economy and environment. However, sustainable development can be achieved only when economy, environment and society develop all at once. So, this section emphasizes the need for further discussions on social development issues to better achieve sustainable development.

Based on that, section 3 goes over ideas which have been exchanged throughout the last series of G20 Summits. During the Summits so far, green growth strategies have been laid out to deal with energy issues, tackle climate change, and attain sustainable development. Section 4 then offers green growth policy directions for sustainable development. Some of them include enhancing social development and international cooperation, establishing green governance, and reducing energy price volatility. The last section reviews what has been mentioned in previous sections and provides the prospects for sustainable development.

## **2 Green Growth and Sustainable Development**

### **2.1 Green Growth**

The term green growth was first introduced by Ekins, in his book entitled “Economics Growth and Environment Sustainability.” The subtitle of his book was “The prospects for Green Growth.” Ekins (2000) explained how environmental sustainability is related to economic growth and human welfare. He showed that if technological changes and the right policies are put in place, environmental sustainability and economic growth can be achieved at the same time.

The word green growth was first officially used in the 5th Ministerial Conference on

Environment and Development in Asia and the Pacific, which was held in Seoul. The declaration of the conference defined green growth as “environmentally sustainable growth.” Also, the Seoul Initiative was proposed at the conference to simultaneously address sustainable development and social issues such as environment and poverty.

Korea is one of many countries where there have been active discussions on green growth. The term green growth was publicly used in President Lee Myung-Bak’s congratulatory speech, which was delivered to commemorate the 60th anniversary of the founding of the Republic of Korea.. During his speech, President Lee officially announced “Low Carbon, Green Growth,” a whole new paradigm through which the country will pursue sustainable development, while reducing greenhouse gas emissions and environmental pollution, and create a new growth engine and job opportunities through green technologies and clean energy.

Since then, the Korean government and academic circles began to conduct discussions on green growth. Presidential Council for Future and Vision released a book called “The Way to Green Growth” in 2009, which is a prime example of literatures published during the period. The book says that economic growth and environment, the two core factors of green growth, can be pursued together. Also, the book defines green growth as a “national development strategy that sets green industry, which is based on green technology such as new renewable energy technology, energy and resource efficiency technology, convergence technology related to environmental pollution reduction technology, as [the] new growth engine to convert not only economic and industrial structure but also modus vivendi to low carbon and eco-friendly ones and to improve the overall quality of life.”

In 2009, the government launched the Presidential Committee on Green Growth, and the Committee took the lead in establishing the “Five Year Action Plan for Green Growth.” The plan set a vision for Korea to become the world’s 7th greatest green power by 2020 and the 5th by 2050 and laid out strategies and policy directions to achieve that goal. Also, to lay firm legal foundations for green growth, the government implemented “Framework Act on Low Carbon, Green Growth” and “Enforcement Decree of the Framework Act on Low Carbon, Green Growth.”

Article 2 of the Framework Act defines that green growth is “a balanced growth between economy and environment, where climate change and environmental pollution are reduced through efficient use and conservation of energy and resources, and where a country creates a new growth engine and job opportunities through R&D in clean energy and green technologies.” Taking a closer look at Korea’s moves, one can observe that the ‘low carbon, green growth’ vision is a comprehensive strategy which allows a nation to not only develop economy and environment at the same time, but also improve people’s lives and achieve sustainable development, as stated in Kang (2010a; 2010b).

Various international organizations such as OECD, UNESCAP and the Ministry of Land, Transport and Maritime Affairs (MLTM) of Korea provide their explanations of what green growth is. According to OECD (2011), Green Growth means “fostering economic growth and development

while ensuring that natural assets continue to provide the resources and environmental services of which our well-being relies.”

UNESCAP defines green growth as “a policy focus for the Asia and Pacific region that emphasizes environmentally sustainable economic progress to foster low-carbon, socially inclusive development.” The MLTM et al. (2012) states that green growth is “a strategy that fosters economic growth and development, protects natural ecosystems and the resources and environmental services they provide, and enhances socially-inclusive development.”

As mentioned above, green growth is a tool for sustainable development, and it was developed to fulfill the need to grow the economy and protect the environment at the same time, going well beyond the conventional idea that economic development and environmental protection cannot be achieved together. If green technologies and industries are well developed, countries can sustain their growth while still improving the environment, without having to undermine their economies.

However, social issues such as poverty and income inequality cannot be automatically resolved through economic and environmental development. These issues need to be dealt with care and specific policies. In this regard, these social issues were not given much attention in developing green growth strategy. In order for green growth to attain sustainable development as expected, a roughly equal amount of attention should be poured into economy, environment and social issues.

**Table 2.1 Definitions of Green Growth**

	Definitions
The 5th Ministerial Conference on Environment and Development in Asia and the Pacific (2005)	Environmentally sustainable growth.
President Lee Myung-Bak’s speech in the 60th anniversary of the founding of Republic of Korea (2008)	A new national development paradigm through which the country will pursue sustainable development, while reducing greenhouse gas emissions and environmental pollution, and create a new growth engine and job opportunities through green technologies and clean energy.
Presidential Council for Future and Vision (2009)	National development strategy that sets green industry, which is based on green technology such as new renewable energy technology, energy and resource efficiency technology, convergence technology related to environmental pollution reduction technology, as new growth engine to convert not only economic and industrial structure but also modus

	vivendi to low carbon and eco-friendly ones and to improve the overall quality of life.
Framework Act on Low Carbon, Green Growth (2011)	A balanced growth between economy and environment, where climate change and environmental pollution are reduced through efficient use and conservation of energy and resources, and where a country creates a new growth engine and job opportunities through R&D in clean energy and green technologies.
UNESCAP	A policy focus for the Asia and Pacific region that emphasizes environmentally sustainable economic progress to foster low-carbon, socially inclusive development.
OECD (2011)	Fostering economic growth and development while ensuring that natural assets continue to provide the resources and environmental services of which our well-being relies.
MLTM et. al (2012)	A strategy that fosters economic growth and development, protects natural ecosystems and the resources and environmental services they provide, and enhances socially-inclusive development.

## **2.2 Sustainable Development**

Thanks to economic growth, people's lives have become convenient and prosperous. However, it all came with a steep price. Due to the emergence of environmental pollutions and depletion of resources, questions have been raised whether economic development can be maintained in the years ahead. "The Limits to Growth," published by the Club of Rome in 1972, is a literature which dealt with such questions.

The report argued that countries should choose to pursue zero-growth strategy to sustain the environment. That is, the world cannot afford any more economic growth because growth only incurs pollution. This may sound relatively reasonable for advanced countries since they have already enjoyed enough growth. However, it is not plausible for developing countries whose urgent need is to develop economy. The Club of Rome's zero-growth strategy has never been implemented as the world was fiercely divided over different views.

"Our Common Future," published by WCED in 1987, dealt with sustainable development on the most number of occasions in modern history, and it offers a definition which is most often used by governments and other organizations. The report says that "sustainable development is the development that meets the needs of the present generation without compromising the ability of the future generation to meet their needs." The definition is somewhat ambiguous in that it does not

provide any specific directions. However, it definitely sets the stage for many international organizations and governments to start discussing ways to pursue sustainable development.

The European Union, as a whole, shows their dedication to sustainable development, as can be observed from their active debates. In the Treaty of the European Union, sustainable strategies are clearly outlined. While setting long-term strategies for sustainable development, the EU states in article 3 that sustainable development pursues a balanced economic growth, social progress, and environmental protection.

In article 21, the EU explains that it is necessary to promote both social and environmental development as a way to eradicate poverty. At the same time, the need for multilateral cooperation and international governance in solving environmental issues and achieving sustainable development is clearly stated. Regarding this statement, the Treaty is very meaningful because it raised the necessity to achieve sustainable development while pursuing social development or improving people's life. Not just that, it also emphasized the importance of global governance where countries with the same goals work together.

Korea also enacted a law and set a national vision to attain sustainable development. The government is now implementing 'Sustainable Development Law,' a revised version of 'Framework Act on Sustainable Development,' enacted in April 2010. Article 2 defines sustainable development as a development which pursues a balance between economic growth, social stability and integration, and environmental protection. This shows that Korea's vision coincides with that of WCED and the European Union.

In general meetings held in 2007, 2009, and 2011, the AICESIS stressed the importance of economy, environment, and social development in attaining sustainable development. Also, ways to promote international cooperation, establish international governance, and encourage citizens to participate in a step toward sustainable development were discussed as well. At the Rio+20 Summit, hosted by Brazil in June 2012, a report named "Achieving Sustainable Development through Green Economy" was revealed. The report gives a comprehensive view of discussions at the AICESIS and lays out a vision for the future. It argues that in the process of pursuing sustainable development and economic growth, various challenges that threaten the world need to be handled as well. It is now safe to say that promoting social development is a core issue in sustainable development.

According to a comprehensive analysis on various discussions which took place in different governments and international bodies, it is safe to say that sustainable development consists of three important pillars. They are economic, social, and environmental or eco-friendly development. The world can achieve sustainable development only when there is a balance among these three factors and when they are in a virtuous cycle.

### 2.3 Comparison

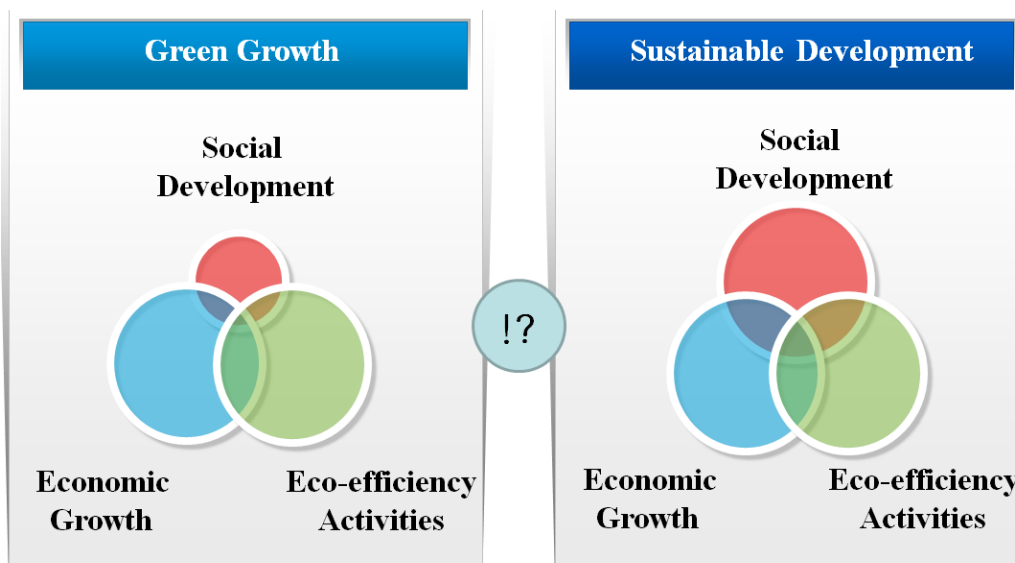
Figure 2.1 shows that green growth and sustainable development are not two different ideas. Green growth is a tool for sustainable development. However, as mentioned above, green growth does not give much attention to social developmental aspect. Therefore, the existing green growth strategies are not enough. Social development issues range from absolute and relative poverty, income inequality, the enhancement of capabilities, social integration to various kinds of social conflicts.

These cannot be resolved by creating jobs alone. In the near future, green growth should transform itself as a comprehensive development strategy which can deal with many different issues. It should also set out action plans in details. Only then can it fully equip countries with capacity to implement policies on sustainable development and be recognized as an idea that goes along the same line as sustainable development.

Across the globe, terms quite similar to green growth are being used, such as green economy, low-carbon green growth, and ecological efficiency. Instead of arguing over which terminology to use, countries must get rid of shortfalls and pull together so that green growth or green economy can develop as a critical and efficient tool for sustainable development. Sustainable development and its three pillars of economic, environmental, and social development are goals shared by every nation on earth.



Figure 2.1 Green Growth and Sustainable Development



### 3 G20 and Green Growth

The Group of Twenty, consisting of G8 members along with key emerging economies, was inaugurated at the 1999 IMF Annual General Meeting. In recognition that no international body focused on global financial and foreign exchange crises since the Asian financial crisis, the G20 was given a mandate to deal with those matters. At first, only finance ministers and central bank governors of member countries participated in the meeting. Then finally, the G20 Summit was created as a response to overcome the severe 2008 financial crisis.

At the first and the second G20 Summit, the heads of state discussed the macroeconomic policies needed to take action against the global financial crisis. Then since the third summit in Pittsburgh, strategies to manage climate change have been included in the summit agenda. This section will cover the evolution of green growth agenda since the summit in Pittsburgh.

#### 3.1 Pittsburgh Summit

The first G20 summit did not address climate change at all and the second meeting gave a little emphasis on climate change. Nevertheless, economic crisis was still a much higher priority. It was only since the Pittsburgh meeting that the leaders started to become aware of the magnitude of climate change and have heated debate over ways to respond to it. Indeed, among 8 major issues, energy security and climate change was laid out in agenda number 5.

Ensuring that the clean energy industry remains stable and that it garners trust from people is essential to sustainable development. So this was a critical issue at the meeting. In fact, extreme volatility and inefficiency of energy markets have a negative impact on everyone involved. In light of this, the leaders took note of the St. Petersburg Global Energy Security Principles which energy producers, consumers, and transporting countries adhered to, and reached an agreement as follows.

In order to promote transparency and stability of oil markets, starting in January 2010, the leaders agreed to make precise and timely announcements on information about oil production, consumption, refinement, and reserves.

They not only welcomed the efforts made by International Energy Forum (IEF) in collecting information on natural gas through its Secretariat Joint Oil Data Initiative (JODI), but also decided to work together to build capacity to precisely predict energy supply and demand, and collect energy-related data.

Commodities futures markets need to endorse recommendations made by International Organization of Securities Commissions (ISOCO) and implement them. In order to improve regulatory mistakes, the authorities decided to ask energy markets to collect and provide intensive and massive information on the locations of traders. They also asked for progress reports at the next meeting. Moreover, they committed themselves to take action against measures that tend to manipulate markets by triggering extreme price volatility.

An increase in energy efficiency can play a critical role in beefing up energy security and combating climate change. To do that, countries are in a great need to correct problems resulting from inefficient fossil fuel subsidies. These subsidies not only encourage excessive energy consumption and distort energy markets, but also hinder investments in clean energy and undermine efforts to respond to climate change. So, the leaders decided to rationalize the subsidies for a while and then get rid of them gradually. However, these changes will not be made in national projects initiated to develop clean energy and to reduce greenhouse gas emissions dramatically.

Enlarging the supply of clean and renewable energy, and improving energy efficiency are important in protecting the environment and in dealing with climate change threats. Therefore the leaders decided to promote investments needed to increase energy efficiency of clean and renewable energy, and to assist developing nations in carrying out relevant projects.

### **3.2 Toronto Summit**

During the G20 Summit held in Toronto in June 2010, climate change was included as one of the major issues discussed. In addition, the leaders stressed the importance of green growth and urged countries, which are not signatories of the Copenhagen Accord, agreed at the 15th Conference of the

Parties (COP15) in December 2009, to endorse it.

Also, the G20 leaders affirmed their commitment to produce successful outcome at the COP16, to be held in Cancun, Mexico in December 2010. As for energy subsidies, every nation proposed action plans to improve energy subsidy programs. They decided to correct the situation where inefficient fossil fuel subsidies have actually encouraged the consumption of fossil fuel. To address this problem, the leaders were determined to come up with a midterm solution and continue to deal with the issue in the next summit.

### **3.3 Seoul Summit**

At the Seoul G20 Summit, held on November 10 and 11, 2010, the major energy agendas were fossil fuel subsidies, price volatility in fossil fuel markets, international protections of marine environment, climate change, and green growth. The main agreements reached at the summit are as follows.

First, leaders came to an agreement to rationalize fossil fuel subsidies according to the circumstances of each nation and phase out those subsidies in the end. This is due to research findings that inefficient fossil fuel subsidies only encourage more wasteful consumption of energy. If any progress had been made on Pittsburgh and Toronto agreements, it had to be reported at the 2011 France Summit. Also, the leaders realized the significance of sharing policies, programs, relevant knowledge, expertise, and capability in eliminating ineffective fossil fuel subsidies.

Second, the JODI showed a strong stance against price volatility in fossil fuel markets. In order to raise the quality, timeliness, and reliability of JODI data, the heads of state asked IEF, IEA, and OPEC to write reports in details. In June 2010, countries were to show support for a report published by The International Organization of Securities Commissions (IOSCO) in November. Also, to improve regulations and boost transparency in oil and financial markets, specialists at the IOSCO were required to analyze and report on future measures needed. In addition, the heads of government agreed to monitor any changes or progress in the oil OTC derivatives market and make a report on them at an IOSCO meeting in April 2011.

Third, as for international protection of marine environment, the leaders welcomed the progress achieved by the Global Marine Environment Protection (GMEP), an initiative established with an aim to share best practices to safeguard the marine environment, to prevent accidents related to offshore exploration and development, as well as marine transportation.

Fourth, the threat of global climate change was addressed as an urgent priority for all nations. Therefore, it was reiterated that there is a compelling need to take specific measures. The leaders showed their commitment to UN climate change negotiations and reaffirmed differentiated

responsibilities, principles, objective, and provisions of the UN Framework Convention on Climate Change (UNFCCC). Furthermore, they showed support for the Seoul Summit agreement and its implementation, as they did with the Copenhagen Accord.

In recognition that both climate change and loss of biodiversity are linked, the leaders identified that the threatened biodiversity is a global challenge. The successful conclusion of COP10 in Nagoya was welcomed as well.

Moreover, nations were committed to support country-led green growth policies that pursue environmentally sustainable growth along with job creation, while ensuring energy access for the poor. The heads of state also recognized that green growth strategies which enable the development of energy efficient and clean technologies allow countries to take a great leap forward to advance their old technologies in various sectors.

To that end, the leaders dedicated themselves to the creation of environment which will help green industry grow and which is beneficial to the development and deployment of relevant policies and practices. They promised to set up clear and consistent standards, mobilize funds, and support education, enterprise, and R&D by working on relevant policies. They also agreed to pursue cross-border cooperation in coordinating national legislative approaches and to encourage investments in green industry-related areas.

### **3.4 Cannes Summit**

The Cannes G20 Summit, held in France in November 2011, covered various agendas ranging from setting up global strategies for growth and employment to establishing international monetary system, reforming the financial sector, dealing with energy and climate change issues, and developing river basin.

As is mentioned in the Summit Declaration, the heads of state emphasized the importance of enhancing transparency, adjusting price volatility, improving energy efficiency, and increasing access to clean energy in energy markets. These are issues related to climate change and green growth. Also, the G20 leaders committed to continue efforts to promote sustainable development and green growth, and combat climate change.

First, the G20 discussed ways to improve energy markets. In specific, member countries promised to provide standards for JODI-Oil, such as timeliness, completeness, and consistency, and ensure that countries comply with those standards at the earliest possible date. Also, they showed support for working together to strengthen confidence in IEF JODI-Oil.

They welcomed the Riyadh Symposium where short, mid, and long term outlook for oil markets will be provided and the IEF Charter which calls for a need to increase exchanges between oil

producers and consumers. The leaders requested that IEF, IEA, and OPEC hold annual meetings, issue joint declarations, and seek methods to enhance transparency in gas and carbon markets. As for JODI Gas, countries pledged to make contributions to improving quality.

The heads of state also asked IOSCO, in cooperation with IEF, IEA, and OPEC, to ask financial ministers to submit their plans to improve functions of and monitoring by institutions which make official announcements on prices, until the mid-2012.

They also welcomed a joint report by IEA, OPEC, OECD and World Bank. The joint report will be addressing each country's progress on the mid-term elimination of inefficient fossil fuel subsidies and fossil fuel itself.

Second, for marine environmental protection, the G20 leaders welcomed the establishment of a mechanism where countries can share best practices of and progress on marine preservation. The mechanism will be set up in cooperation with OECD, IRF, and OPEC. The leaders also welcomed the idea of coming up with precautionary measures to address all kinds of accidents related to submarine mineral resources development.

To promote the use of clean energy, and to pursue green growth and sustainable development, countries agreed to optimize their potential, expand low-carbon development strategies, and enhance the development of clean energy technologies. They committed to work towards a successful outcome at the 2012 Rio+20.

As a part of efforts to fight climate change, the leaders promised to vote for South Africa as a chair country and exert efforts to reap fruitful results at the 2011 Durban Climate Change Conference. They reaffirmed that they were ready to establish and run Green Climate Fund based on reports produced at the Durban Conference.

To assist developing countries in mitigating climate change and enabling them to adapt to climate change, the G20 leaders pledged to set a joint goal of raising \$100 billion every year until 2020. They analyzed reports, published by World Bank, IMF, OECD, and MDB, on securing finances to help developing nations respond to climate change.

The heads of state reaffirmed that the Fund will consist of innovative financial sources raised by public-private partnership, and bilateral and multilateral cooperation. They asked multilateral development banks to develop new financial techniques to attract investment from the private sector.

### **3.5 Los Cabos Summit**

During the G20 Summit, held in Los Cabos in June 2012, green growth was one of the critical agendas. Among 10 issues in the G20 Leaders' Declaration, green growth is laid out in agenda number 7.

Cooperative methods to enable developing nations to rightly pursue sustainable development, including inclusive green growth, were put forward in the summit among others. Moreover, the leaders welcomed international efforts to introduce Green Growth Knowledge Platform (GGKP) and requested that an effective mechanism be made to mobilize public and private funds with aims to boost inclusive green growth investments in developing countries.

Furthermore, in order to search for appropriate ways to raise funds for climate change in consideration of purposes, preparedness, and principles of the UN Convention on Climate Change, the heads of states welcomed the idea of establishing a ‘G20 study group.’ They also committed to support operationalization of the Green Climate Fund (GCF).

During the summit, green growth and sustainable development were underlined as strong, potential factors in promoting long-term prosperity and welfare. The G20 representatives promised to make self-reports on measures to embrace green growth and sustainable development as structural reforms.

At the same time, the leaders reaffirmed their commitment to rationalize and phase out ineffective fossil fuel subsidies. As concluded during the meeting, the financial ministers of G20 countries will be asked to submit relevant report until the next summit and seek ways to encourage voluntary peer reviews.

Aside from green growth, the leaders discussed methods to stabilize the world economy, assist the global economic recovery, guarantee employment and social security, promote trade, strengthen the international financial system, improve the financial sector, pursue financial inclusion, beef up food security, stabilize volatile commodities prices, deal with challenges in development, and tighten regulations against corruption.

#### **4 Policy Directions**

As mentioned above, the G20 focused on agendas in climate change and green growth. In specific, major issues include implementing green growth strategies for sustainable development, establishing a system to deal with energy and climate change issues, searching for ways to provide developing nations with technological and financial assistance, and addressing how to deal with volatile energy prices and their spillover effects.

Despite numerous, active debates, countries did not come to an agreement in so many issues because their opinions differed. Therefore, with the 8th G20 Summit to be held in Russia in 2013, the leaders have to exchange ideas to achieve sustainable development. In particular, as for climate change and green growth, the heads of government have to identify what challenges there are and what directions to take.

#### **4.1 Social Development**

It has been pointed out that social development, one of the critical pillars of sustainable development, was not much incorporated into green growth. To achieve our ultimate goal, sustainable development, countries have to develop society further. At first glance, people usually think of relieving poverty. However, that is not all. Countries must reduce both absolute and relative poverty, get rid of social anxieties, and increase people's satisfaction levels in economy as well.

In fact, there are many factors that cause conflicts in society and these problems exist among genders, regions, generations, and social classes. To resolve conflicts and integrate society, policies need to embrace different groups. To that end, countries must establish a firm social safety net and set up inclusive social policies.

Nevertheless, a mere push toward equality is not the way to go. Fairness should not undermine social dynamic. It is a hard fact that the existing economic policies and green growth did not consider much about the complexity of social development.

These days it is possible to evaluate economic and environmental achievements with objective standards. Relatively speaking, not much effort was made to develop objective indicators to use in assessing social development. This is why countries need to create appropriate indicators to measure and assess social development and green growth, and examine where we stand on our road to sustainable development.

There are many different elements that affect social development. Instead of just pursuing an equal society, countries must create an environment where different branches of government cooperate and resolve differences, leading to the creation of policies that not only address poverty, but economic growth as well. If necessary, countries should take immediate measures to reform systems on a broad scale.

#### **4.2 International Cooperation**

Climate change is a global issue. Disasters related to climate change are frequently happening around the globe. Global warming caused by greenhouse gas emissions are affecting not just large emitters themselves, but neighboring countries as well. Therefore, nations need to work together in addressing climate change issues. However, given that externality arises due to environmental problems, countries have been divided over which nation should bear more responsibilities and costs in dealing with global warming.

The economy of developing countries, mostly large greenhouse gas emitters, will be hit hard if

their greenhouse gas reduction targets were as high as those of advanced nations. This is why they have not readily agreed with global action against climate change led by advanced countries. In addition, they could not take any specific measures to fight climate change even though they felt the need to come up with climate change policies. This is largely due to lack of appropriate technologies. In order to help developing countries actively participate in international actions, the global society needs to equip them with enough finances and technologies. We need to ensure them that green technologies will help them nurture green industry which will grow their economy, create more jobs, and improve income inequality.

Advanced nations have to make investments in developing nations and provide technological assistance because these countries do not have enough financial sources to promote their green technologies and green industry. Without such assistance, declaration itself will not do anything meaningful.

ODA is the most well-known, international cooperative approach that advanced countries can take to provide direct assistance to developing nations. However, it is difficult to boost international cooperation in green growth through ODA. This is largely because definitions of green ODA are not unified, both at home and abroad.

Kang (2011) offers a broad definition of green growth ODA, including environment ODA which covers environment itself, climate change, and a broader type of green growth ODA which is associated with the creation of a new engine growth, and promoting life quality and national image. The categorization in use is based on CRS code which is more detailed than Rio Marker, an existing environmental marker.

In this regard, Kang's definition of green growth ODA goes well beyond providing developing nations with technological and financial assistance. Kang explains that green growth ODA should not only help developing countries, but also the entire globe to achieve green growth. As for this, further discussions are needed. In the years ahead, global leaders should come up with a clear definition of green growth ODA, which can be accepted in the world and promote global cooperation for green growth.

Green Climate Fund is also an effective tool for green growth. The GCF will enable developing countries to nurture clean energy technologies and to adapt to climate change. At the 2010 UNFCCC COP16, the heads of state agreed to establish the GCF and the United Nations committed to raise \$100 billion every year until 2020. At the 2011 UNFCCC COP17, the GCF Design Committee report was adopted. Through the adoption, the Fund will be launched as soon as possible.

It is a hard fact that direct technological and financial assistance is needed to spread global growth. More importantly, this should be based on effective policies and people's recognition that green growth is a must. A lot of knowledge and wisdoms associated with green growth is shared in international organizations. However, many significant discussions are led mostly by OECD countries.



At the G20 Mexico Summit, the leaders emphasized the need to establish an international mechanism where countries can share knowledge and enhance cooperation, just like the GGKP. The GGKP should be built in a way so that even developing countries can readily get involved, going well beyond a global knowledge network of advanced countries. By encouraging countries to share policy directions and action plans, the GGKP should ensure that every nation can boost its capacity and take a great leap forward in sustainable development.

### **4.3 Green Governance**

In order to guarantee consistency in implementing green growth policies, each nation needs a main organization which is equivalent to a control tower. Government departments, agencies, and social groups which work on green growth should pull together through the main organization. Green growth is not just about environmental regulation and protection. It is associated with many different issues. Therefore, green growth policies should be rightly executed, while maintaining a close collaboration among government departments and minimizing conflicts among shareholders.

Countries like Greece, France, Australia, and Britain have a department in charge of climate change response. It is through this department that these countries are working on green growth. As for Korea, 'Presidential Committee on Green Growth' plays a key role in implementing green growth policies. 'The Ministry of Environment and Climate Change,' 'the Ministry of Ecology, Sustainable Development, Transport and Housing,' and the successor of 'the Ministry of Ecology and Sustainable Development', are in charge of green growth for Greece and France, respectively. 'The Department of Climate Change and Energy Efficiency,' the successor of 'the Department of Climate Change' manages green growth-related work in Australia. In Britain, 'the Department of Energy and Climate Change' was newly created in 2008.

Among others, Korea's Presidential Committee on Green Growth is an exemplary case where government departments work with social groups. The Committee is co-chaired by prime minister and a private expert. There are 13 commissioners designated by law and 36 commissioners nominated by president. The former group of commissioners consists of green growth-related ministers and the latter is made up of professors, scholars, entrepreneurs, and other social activists.

The commissioners are assigned to review policies, gather extensive opinions, and make policy suggestions. They are divided into 'Green Institution and Finance,' 'Green Growth and Industry,' 'Climate Change and Energy,' and 'Green Life and Sustainable Development' sub-committees. Although the Committee was expected to make policies and play a key role as a control tower, it is simply involved in an advisory capacity. Nevertheless, the Committee itself is a step forward towards green governance.

Green growth is essential to economy, environment, and society. That is why government departments, industries, and civil society should take part in the establishment of green governance. The major role should be assumed by a government department in charge so that different opinions will be heard and that policies will be formulated. Just as is done in the Presidential Committee, the government should make sure that diverse groups actively participate in achieving green growth.

Also, the government needs to provide a clear legal foundation and authority for the main organization to carry out its mission. Concrete green growth policies which are built on progress made in theoretical and conceptual discussions will guarantee the desirable outcome.

#### **4.4 Energy Price Volatility**

Energy price volatility is an external factor which makes it hard for developing nations to implement green growth policies. High volatility triggers fierce competition over energy and bring vulnerable companies and countries to the brink of collapse. Increases in price volatility disable developing nations which are heavily dependent on imported energy from acquiring energy. This still hinder short and long-term economic growth for developing countries because they usually don't have sufficient access to alternative energy. In the end, price volatility causes both economic and social anxiety, thereby discouraging developing nations from pursuing green growth. It can also strike a blow to the poor. Indeed, there will be a rise in the number of “energy poor” people who can't have access to a minimum amount of energy.

Since the 2009 Pittsburgh Summit, the leaders began active discussions on energy price volatility. They offered a broad range of ideas to relieve price volatility from enhancing transparency in energy markets, promoting exchanges between energy producers and consumers, and making improvements on regulations in futures markets. At the 2010 Seoul Summit, further discussions on price volatility of energy, including fossil fuels, took place. At the summit, the leaders agreed to support green economic policies which will ensure energy access for the poor, and promote eco-friendly and sustainable growth simultaneously. Also, they committed to create an environment where energy efficient technologies will be developed and distributed, and the establishment and implementation of clean energy policies will be promoted in both member and non-member countries.

Eventually, countries have to reduce the consumption of energy which emits a lot of greenhouse gases, such as fossil fuels and instead, use more eco-friendly energy. However, energy price volatility forces countries to focus on dealing with energy supply and demand issues, rather than developing environmentally friendly technologies and renewable energy. In the end, it discourages countries from developing green technologies. The optimization of energy mix can be achieved through green growth policy, only when prices of energy, including fossil fuels, are stabilized. Therefore, the international community should openly discuss methods to oppress price volatility and

strive to put them into action.

Above all, conflicts between energy producers and consumers need to be resolved so that energy prices can stay calm. To that end, energy-related organizations such as IEA and OPEC should promote energy quality and raise confidence in price determination processes. Also, they must ensure that energy is produced by internationally respected organizations and require the energy supply and demand problems in the market to be reviewed and corrected.

In the long run, countries must push the development of green energy technologies and decrease their vulnerability to extreme changes in energy prices. Also, they need to refrain from using energy which produces a lot of greenhouse gases. Instead, they have to use more environmentally friendly energy. Energy-related issues have adverse impact on individuals, as well as national economy and companies. In light of this, countries must work hard to establish policies to reduce energy price volatility.

## **5 Conclusion**

As mentioned before, economic development which evolved around fossil fuels increased income and reduced poverty. However, such development triggered a drain on natural resources and global climate change. Therefore, relying on fossil fuels, the conventional way of development, cannot be pursued any longer. The international society has recognized the gravity of these issues, and embarked on designing specific plans for sustainable development and implementing them.

So far, advanced countries have taken the lead in providing strategies to deal with environmental problems, climate change, and economic growth. Many developing nations, on the other hand, have not been active in working together with developed countries because they have a bigger desire to develop their economy than to combat climate change. Nevertheless, at a time when climate change has a severe impact on not just individual lives, but national security as well, countries can no longer afford economic development without thinking of environmental problems.

Against this backdrop, green growth is an eco-friendly economic development strategy which will help countries grow economy and protect environment simultaneously. Green growth is essential to sustainable development. Sustainable development, the ultimate goal, can be achieved when development takes place in economy, environment, and society, all at the same time. However, compared to economic and environmental development, not enough discussions have been made about social development.

Including green growth as a strategy to achieve sustainable development, various issues such as energy and climate change were discussed in depth at the G20 summit. In specific, the leaders talked about ways to improve unstable energy markets, beef up energy security, enhance energy-

related data, gradually eliminate ineffective fossil fuel subsidies, increase access to renewable energy, increase energy efficiency, protect marine environment, and preserve biodiversity. Other topics include clean energy technologies, the Green Climate Fund, the GGKP, and the need to establish an efficient mechanism to manage public and private funds.

At the recent G20 Summit in 2012, there were two major issues. First, leaders argued that there is a need to build a specific plan to promote green growth for member countries which are in the process of reform. This was a new topic. Second, countries discussed that developing and the world's poorest nations need assistance in green growth, as well as in reducing poverty and enhancing development.

Despite numerous active debates, countries did not come to an agreement in so many issues because their opinions differed. Views on green growth are divided within G20, between advanced countries and emerging economies. Such gap needs to be narrowed. Therefore, for the 8th G20 Summit to be held in Russia in 2013, here are climate changes and green growth policies each nation needs to adopt to achieve sustainable development.

First, discussions on social development are essential to create successful green growth policies. Social development, one of critical factors in sustainable development, goes beyond reducing absolute poverty. It needs to deal with relative poverty and income inequality as well. In addition, enhancing social capacity and social integration, and resolving social conflicts are all part of social development. All of these issues are what every nation faces today, not just developing countries.

Second, countries need to boost international cooperation. No country is immune from climate change. No nation can resist the need to pursue sustainable development. Until now, developed countries have come up with concrete plans and put them into practice. The problem is that developing and the least developing nations are not well prepared. This is why advanced nations need to provide technological and financial assistance for developing nations. Green growth ODA can be an alternative. In addition, countries need to enhance the GGKP and the GCF, which already has been discussed.

Third, there is a compelling need to pursue green governance. In order to implement green growth policies effectively, countries need a powerful control tower. Green growth is not just an environmental issue. It is associated with a broad range of agendas. Therefore, a main organization has to resolve conflicts and deal with those conflicts systematically. Many countries including Greece, France, Australia, and Korea are working hard on green governance, by creating a new department or extending the function of the existing department. Nevertheless, a lot needs to be improved. For instance, the control tower should be given a clear legal authority so that it can play an effective role as a mediator.

Lastly, energy price volatility needs to be discussed. Extreme changes in energy prices will discourage developing nations from pursuing green growth. In most cases, these countries heavily rely

on imported energy, and in fact, they even do not have access to alternative energy. Furthermore, price volatility may be a greater disadvantage for the poor than for the middle and upper class. To solve these issues, transparency needs to be enhanced in energy markets. Also, energy producers and consumers must cooperate, and improvements on regulations in futures markets should be made. In the long term, countries have to reduce consumption of fossil fuels through the development of green technologies.

As previously mentioned, problems related to energy, climate change, and poverty are unavoidable challenges to be overcome. Against this backdrop, the leaders must work together and discuss how to achieve sustainable development. Green growth is definitely an effective tool in achieving that goal to share. This has been proven so in G20 summits and the international community. Instead of arguing over which country should take more responsibility for global challenges, every nation needs to pull together and gather wisdom. In the upcoming G20 Russia Summit in 2013, we look forward to coming up with a win-win approach to green growth.

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## Session 3

# Green Growth and Sustainable Development



### Panelist 1

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Dong-Young Kim is an Associate Professor at the KDI School of Public Policy and Management. He had served as the acting director for the Center for Conflict Resolution and Negotiation (CCRN) at the KDI School between 2008 and 2009. Currently he is the director of the Development Research Team in the Development Research and Learning Network at the KDI School.

His research interests include theory and practice of public dispute resolution and negotiation in developing countries, and participatory & collaborative governance. He currently teaches four courses ('Participatory Governance in Public Decision-Making,' 'Dispute Resolution and Negotiation,' 'Advanced workshop for multiparty negotiation,' and 'Environmental Policy and Sustainable Development').

He has been responsible for an extensive series of the training of mid-career and senior government officials in the field of negotiation and mediation in public disputes in Korea and from other developing countries. Also, Professor Kim has consulted various governmental organizations, such as The Prime Minister's Office, The Ombudsman of Korea, as well as private sectors (Hankook Research) and Non-government organizations (Citizen's Coalition for Economic Justice). Internationally, he participated as an Associate Faculty in International Programme on the Management of Sustainability sponsored by Sustainable Challenge Foundation (SCF) in the Netherlands and organized two-day workshops for Bangladesh government officials at Dhaka, Bangladesh in 2008.

His recent major publications are his paper "Tailoring the Mutual Gains



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Approach for Negotiations with Partners in Japan, China, and Korea,” which was published in the leading journal *Negotiation Journal* and “Challenges of Consensus Building in a Consolidating Democracy” (VDM, 2007)

He earned two Master’s degrees (Master of City Planning from Seoul National University, Korea and Master of Environmental Management from Yale School of Forestry and Environment.) He received his Ph.D. in Public Policy and Environmental Planning from MIT.

Since 2007, Professor Kim has received the annual “Award for Excellence in Teaching” from the KDI School of Public Policy and Management for four consecutive years. His email address is [dykim@kdischool.ac.kr](mailto:dykim@kdischool.ac.kr).

## Session 3

# Green Growth and Sustainable Development



### Panelist 2

## Sang In Kang

Senior Researcher of Korea Environment Institute, Korea

Sang In Kang is currently director general of Global Strategy Center at Korea Environment Institute. He previously held the head of Green Growth Research Division at National Research Council for Economics, Humanities and Social Sciences (NRCS). Other previous work experience includes the following: Climate Change Specialist in Environment directorate of Organization of Economic Cooperation and Development (OECD) in France, and the director of Sustainable Development at Korea Environment Institute. Also, he engaged in several professional activities as following: Commissioner of Korean National Commission on Sustainable Development and Delegate and Advisor of Korea Mission for WTO DDA, U.S.-KOR FTA, EU-KOR FTA in Ministry of Environment. Since 2002, he has published 49 reports in several fields such as Trade and Environment, Environmental Regulations, Sustainable Development, Integrated Environmental and Economic Accounting System, Green Growth, Integrated Water Management Modeling and Climate Change economics. He received a B.A. and M.A. degrees in Economics from Seoul National University and a Ph.D. in International Economics, in 1997 at University of Paris 1 in France.

## Session 3

# Green Growth and Sustainable Development



### Panelist 3

## Joo Sueb Lee

Senior Researcher of Global Green Growth Institute, Korea

Mr. Joo Sueb Lee is currently working as a Senior Program Manager at the Global Green Growth Institute (GGGI) and on a leave of absence from his position at the Ministry of Strategy and Finance (MOSF) where he has served since 1998. Most recently, he was a director of the Planning and Coordination Team for the Presidential Council on National Competitiveness (PCNC) from 2009 to 2011. During 2008-2009, he was a Senior Deputy Director, International Economic Affairs Bureau (IEAB) at MOSF. Since his joining the Ministry in 1998, he has been in charge of various policy issues related to economic cooperation and international financial policies. He has been participating various round of Korea's FTA negotiations with ASEAN, Japan, Mexico and others, especially in the fields of investment and trade in services. He was also a member of policy reform team of Korea's ODA policies from 2005 and 2006. He received a BA in International Economics and Master in Public Policy from Seoul National University. He obtained another Master degree in Public Administration from the John F. Kennedy School of Government at Harvard University. He also spent the 2007-2008 academic year as an Asia Fellow at the School's Mossavar-Rahmani Center for Business and Government. Mr. Lee has diverse experiences with trade policy, foreign direct investment, Asian economic cooperation, keen knowledge on development aid, economic cooperation between two Koreas, multilateral development banks, and other issues.

## Session 3

# Green Growth and Sustainable Development



Panelist 4

## Yuka Takeda

Professor at Hitotsubashi University, Japan

Yuka Takeda obtained her B.A. (1996), M.A. (1999), and Ph.D. (2007) in economics from the University of Tokyo. She has been a Research Associate (2004–2007) and a Research Fellow (2007–2008) at the Graduate School of Economics, the University of Tokyo, and an Assistant Professor at the Faculty of Political Science and Economics, Waseda University (2008–2010). Since 2010, she has been serving as an Assistant Professor at the Institute of Economic Research, Hitotsubashi University. In 2001–2003, she held a position as a Research Fellow at the Centre of Labour Market Studies, National Research University – Higher School of Economics, Russia. In 2011, she also served as a Consultant for the Kazakhstan project of ILO. Her main research interests are empirical studies on poverty, inequality, and labor market in Russia.